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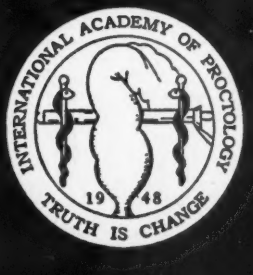

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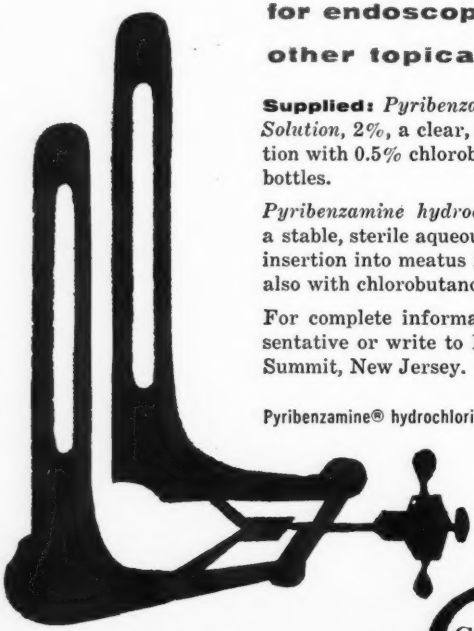

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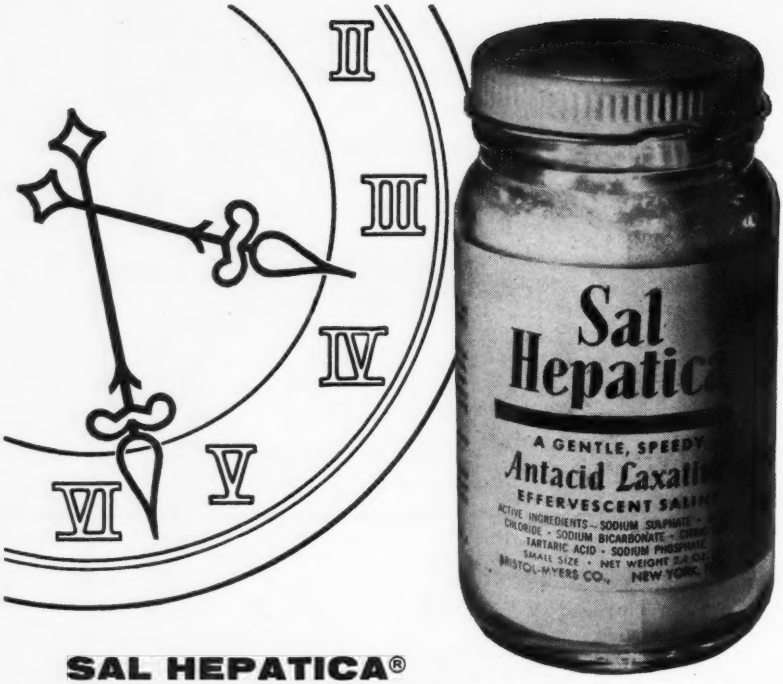

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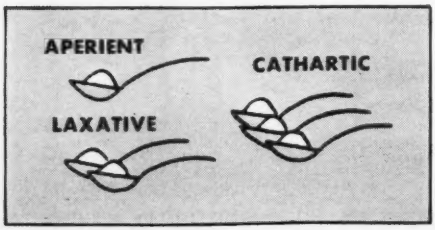

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1. The Physiological Basis of Medical Practice, 1945, p. 486.
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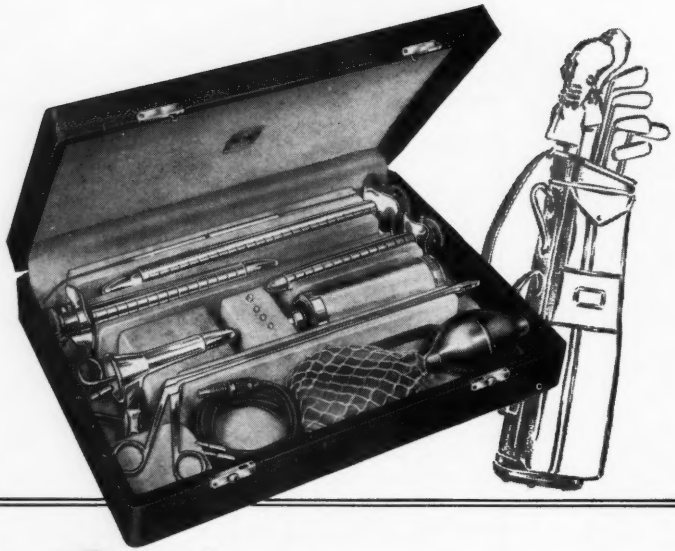

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Vesico-Colic Fistula

EDWARD WILSON F.R.C.S.(England), F.R.C.S.(Edinburgh), F.R.A.C.S., F.A.C.S.
Sydney, Australia

The patient who complains of pneumaturia usually has little indication of the problems his lesion presents from the point of view of treatment. He may or may not have had symptoms of colonic diverticulitis for many years; and he may have had evidence of irritation of the bladder for a few weeks or months before the fistula developed or he may not. In other cases (although these are not common) a cystitis of a severe degree may have preceded or may accompany the appearance of the fistula. Rarely, haematuria will be the only complaint; and in a few cases the patient may notice barium sulphate in the urine after a barium enema. Occasionally, the passage of air or faeces in the urine is not noticed by the patient. Instead of the passage of bowel contents to the bladder, the reverse may occur in the presence of urinary obstruction. The complaint will then be of the passage of urine per rectum. My colleague, Dr. R. J. Malcolm[1], recently had such a patient, and after a colostomy had been constructed, prostatectomy was necessary to relieve the urinary obstruction before proceeding to cure the fistula.

It is of note that this is the one complication of diverticulitis which is more frequent in males. It is rare in females, but is slightly more common if a hysterectomy had been previously performed.

The existence of a vesico-colic fistula may sometimes be demonstrable by the injections of radio-opaque material into the bladder or rectum, Figure 1. On the other hand, the opening may be too small or may be temporarily blocked so that it is not demonstrable by this method. Cystoscopy also will only sometimes show the opening in the bladder mucosa; and in my six cases due to diverticulitis it was only seen in two.

The prevention of vesico-colic fistulae is not practicable in other conditions, but in diverticulitis the development of the fistula may be anticipated when signs and symptoms of irritation of the bladder occur. Because of the problems in treatment presented by an established fistula, and since the risk of colonic resection has become so small, such a resection may now be advised in the "prefistula" stage of diverticulitis as a prophylactic measure.

In 1939 Edwards[5] wrote, "attempts to close a vesico-colic fistula at operation should only be undertaken when the patient is comparatively young and the fistula is of recent occurrence"; but, when he referred to "the lack of

guarantee of success", this was after colostomy and closure of the fistula without bowel resection.

Speaking of the treatment of vesico-colic fistula Pemberton, Black and Maino[6] stated that in their series an attempt was made in three cases to excise the fistulous tract as a primary procedure, but that success was achieved in none whereas all three patients were later cured by resection of the affected portion of the bowel. Mayfield and Waugh[7] also pointed out that any procedure short of resection frequently fails to cure the fistula because the primary cause of the condition is not removed. A vesico-colic fistula may heal temporarily following a colostomy, but it is too much to expect that it can not recur when the colostomy is closed, if the causative lesion in the bowel is allowed to remain. Indeed, in one of my cases the vesico-colic fistula appeared some months after a colostomy had been constructed for the treatment of another complication of diverticulitis. Because of the failure of the inflammation to subside in all cases, and because of the greatly improved methods of preparation of the colon for surgery, Boyden[8] suggested primary colonic resection without a colostomy for vesico-colic fistula, and he reported two cases who were apparently cured.

Fig. 1. Oblique view of pelvis after barium enema showing fifth stage diverticulosis and bladder containing barium. The site of the fistula is indicated by a small collection of barium between the fundus of the bladder and the sigmoid colon.

Results Over the last five years my experience with vesico-colic fistulae included six cases due to diverticulitis, two due to carcinoma of the colon, two due to trauma, and one due to chronic ulcerative colitis[2]. These figures are in keeping with the writings of most authors, for example, Higgins[3] who stated that diverticulitis is the commonest cause of vesico-colic fistula. On the other hand, Ormond and his associates[4] found more of their vesico-colic fistulae were due to neoplasms.

In my cases the openings into the bladder were high up on the fundus except in one due to trauma. In all, the tracts were short. Against that, Edwards[5] and others have described the bladder opening as usually low down on the posterior wall, and the tract has been described as long and sinuous in cases due to diverticulitis. In one of the five cases due to diverticulitis and submitted to operation the fistulous tract was lined with vesical epithelium, in the others granulation tissue only was present.

In one of the six cases of vesico-colic fistula in this series due to diverticulitis, operation was refused by the patient. His symptoms were minimal, probably due to the large opening into

the bladder (about ½" in diameter) which prevented urinary stasis in the presence of infection. In three, treatment followed the orthodox lines of colostomy and then later, bowel resection and urethral catheter drainage. Suprapubic cystostomy was not performed. In two of the cases the suture line in the bladder was reinforced with omentum, but in the third the omentum was short and fixed (due to the colostomy). In this case the site of the anastomosis in the colon was covered with the posterior parietal peritoneum. Subsequently the colostomy was closed, and in the three, two, and one years since then, there has been no indication of any recurrence. In the fifth case, in addition to colonic resection for diverticulitis, excision of the rectum was also required for carcinoma. The fistula between the sigmoid colon and the bladder was quite separate from the carcinoma of the rectum. In the sixth case, following preparation with phthalyl sulfathiazole, a one stage procedure was performed. This consisted of separation of the bladder and colon, oversewing of the opening into the bladder, resection and end-to-end anastomosis of the sigmoid colon, and fixation of the omentum over the bladder. In the two years since then there has been no evidence of recurrence.

In the cases due to carcinoma of the colon and to chronic ulcerative colitis the vesico-colic fistulae were cured following resection of the affected portions of the bowel. In the traumatic cases success was attained in one by a colostomy followed after some weeks by a direct repair through the perineum; in the other, a one-stage repair through the abdominal cavity was successful.

One of the cases due to diverticulitis was aged 32 and the one due to chronic ulcerative colitis was aged 37. The others were all over 55. The greatest difficulty was experienced at the time of operation in a patient of 17 stone, and it was in her that the anastomosis was placed in an extraperitoneal position.

Summary

A series of 11 cases of vesico-colic fistula is presented. Six were due to diverticulitis, two to carcinoma of the colon, two to trauma, and one to chronic ulcerative colitis.

The standard treatment of fistulae due to diverticulitis is a three staged procedure of (1) transverse colostomy, (2) resection of the affected portion of the colon, closure of the opening into the bladder, fixation of omentum over the bladder, and urethral catheter drainage, and (3) closure of the colostomy. However, with improved preparation of the colon the colostomy is now sometimes unnecessary.

Earlier bowel resection in diverticulitis at the time signs and symptoms of irritation of the bladder first appear may prevent the formation of a definite fistula and is therefore to be advised.

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Management of Ureteral Injuries in Proctologic Surgery

MIGUEL DROBINSKY, M.D.
Estelline, South Dakota

The incidence of ureteral injuries incurred in proctologic surgery is at present unknown. However, the magnitude of this complication is such as to merit critical clarification of its proper management. Moreover, there is no unanimity of opinion amongst surgeons, and particularly urologists, regarding the type of repair required in any one instance. This is due, in part, to the lack of an impressive series of cases by any single investigator from which to draw conclusions. We are compelled, therefore, to seek guidance from isolated reports, experiences derived from war casualties, and the much investigated uretero-intestinal anastomosis in total cystectomy.

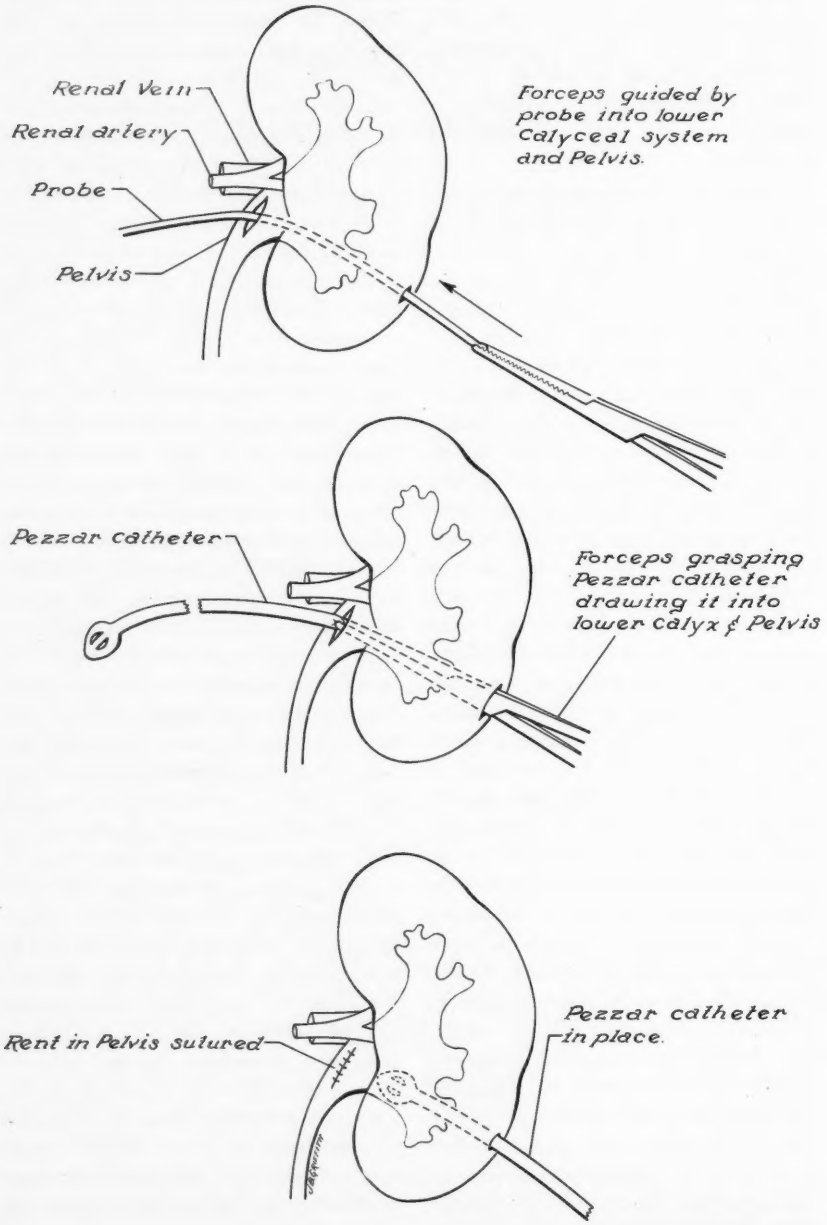
From the point of view of proctology, the ureter can be injured in any portion of its length. On the right side the abdominal ureter lies under the peritoneum, so closely attached to it that the two are not dissociated when the peritoneum is stripped forward. Thus, it is crossed by the spermatic or ovarian vessels, right colic and ileocolic vessels, as it enters the pelvis. On the left, the same peritoneal relationship obtains except that it is crossed by the left spermatic or ovarian vessels, left colic and sigmoidal vessels on its anterior surface. The pelvic portion is again related closely to peritoneum crossing the brim of the pelvis in front of and slightly lateral to the bifurcation of the common iliac artery. In the female, it is crossed again by the uterine artery lying about 1 cm. above the lateral vaginal fornix and about 2 cm. from the supravaginal part of the cervix. At the base of the bladder, it is related to the superior vesical artery which lies above it. Thus, during the procedure of mobilizing the colon, or in the frantic attempt to control massive bleeding, or in manipulating a dense sclerotic lesion where there has been much inflammatory reaction, or in an anomalous position of ureter, or an anomalous double ureter or a hydro-ureter, injuries can follow with dire consequences. These injuries can be listed as (1) crushing by clamp, (2) laceration by sharp instrument, (3) laceration with tearing during blunt dissection, (4) total suture-ligaturing, (5) partial fixation by ligature, (6) excision of portion of ureter, (7) devitalization by extensive stripping. It is questionable if the ureter

can be rendered ischemic by extensive stripping since it enjoys a rich collateral circulation; however, in the presence of marked arteriosclerosis and thrombosis induced by adjoining neoplasm, crude surgical manipulation could conceivably devitalize a segment of ureter.

In view of the diverse forms of injuries, each case must be treated on its own merits. The general principles, however, consist of (1) detection of the injury, (2) diversion of the urinary stream above the point of injury, (3) repair of the defect. These principles will be modified again if the injury is detected immediately or within a week, or as reported in some instances, as late as 21 days post-operatively. The longer the period that elapses between the injury and the repair, the greater the degree and amount of cartilage-like dense scar one must wade through for definitive repair. There are several ways of diverting the urinary stream; primarily by nephrostomy or ureterostomy. The latter procedure applies where injury is detected at the time of surgery and the patient's condition is too critical to endure definitive repair. Nephrostomy is a relatively simple procedure. It is simpler in the presence of an extra-renal pelvis than if the kidney pelvis is wholly intrarenal. In any case, a simple technique is to pass a blunt probe through a small incision in the kidney pelvis into the lowermost calyx and out through the kidney cortex along Brodel's line; a Kocher forceps is guided into the pelvis by engaging the protruded probe; at this point, the distal end of a pezzar or malecot catheter is fed to the forceps and drawn out until the head end lies snugly in the renal pelvis. A drain is inserted in the renal fossa. Since a nephrostomy may only partially divert the urinary stream, it may be necessary to drain the area involving the damaged portion of ureter. As a rule, this procedure will salvage the kidney. Ureterostomy is best done by inserting a #8 or #10 French catheter in the ureter, tying it with Chromic 0 catgut to the ureter, which is allowed to protrude at least one inch or more beyond the skin surface.

The ultimate aim of the definitive repair is re-anastomosis of the ureter or re-implantation into the bladder to restore continuity of the urinary tract. In cases of crushing of ureter by clamp involving a short segment, and of sufficient duration to fully necrotize this segment, it is best to excise the segment, re-anastomozing over a splinting catheter of polyethylene tubing of at least #10 French. This presupposes detection of injury during the intra-abdominal surgery. Should detection be made within a week after surgery as heralded by urinary fistula, sepsis, renal pain (which occurs in only 50% of the cases), peritonitis, etc., then nephrostomy is done, administering urinary antiseptics and antibiotics, to control sepsis. When the patient's condition permits, definitive repair is done. Always catheterize the ureter retrograde by cystoscopy, for the finding of the distal segment of ureter may be a formidable task if much scar tissue has ensued. Should it be impossible to negotiate the distal segment, and if the injury occurred low enough, implantation into the bladder may be done. It is, of course, desirable to reimplant the ureter into the dependent or fixed portion of the bladder to prevent vesico-ureteral reflux and its attendant bouts of pyelonephritis and ultimate sacrifice of

NEPHROSTOMY


Renal Vein
Renal artery
Probe
Pelvis
Forceps guided by probe into lower Calyceal system and Pelvis.
Pezzar catheter
Forceps grasping Pezzar catheter drawing it into lower calyx & Pelvis
Rent in Pelvis sutured
Pezzar catheter in place.

the kidney. An extraperitoneal approach is best; the ureter is fish-mouthed or split 1 cm. The bladder is opened posteriorly, a small forceps passed through the ureteral meatus retrograde, and the split ureter passed into the bladder. Each flap of the ureter is sutured with chromic 4-0 catgut to the posterior surface of the bladder. An anchoring suture is also passed through muscularis of bladder and outer layers of ureter. A splinting polyethylene catheter, #8 or #10, is passed into the ureter and drawn out suprapubically along with a pezzar catheter as a cystostomy tube. The ureteral splinting catheter is removed in two weeks and the cystostomy tube in three weeks. The nephrostomy tube may be removed within 48 hours. In laceration of the ureter, all that is needed is a splinting catheter and drainage extraperitoneally.

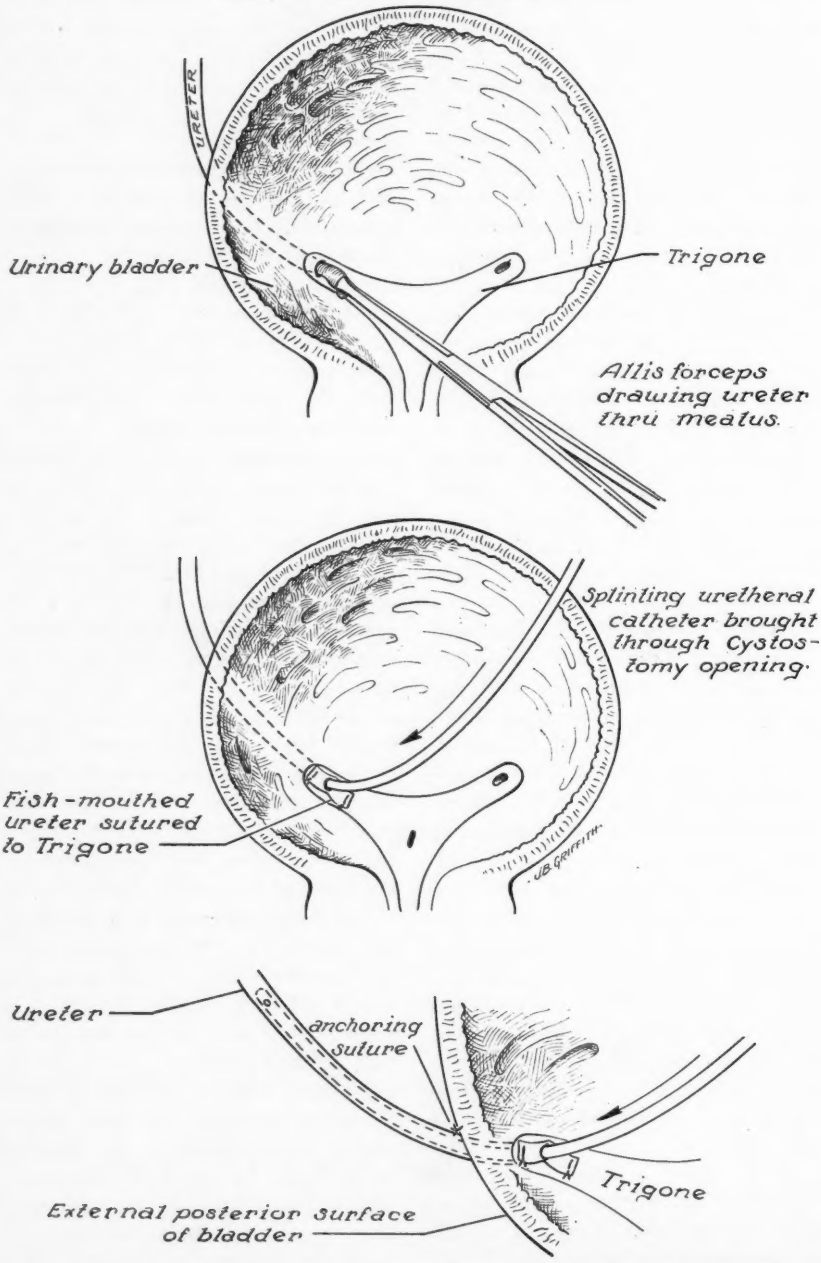
In the late detected cases, spontaneous healing will occur if extraperitoneal drainage is instituted before much sepsis has supervened. In complete laceration with tearing, detected at the time of the surgery, definitive anastomosis over a splinting catheter and extraperitoneal drainage is all that is needed. In anastomosing the ureter, few sutures should be used and tension avoided. In the late detected cases, preliminary nephrostomy is done and the patient is balanced for surgery. If the ends can be sutured, this is done over a splinting catheter with urethral catheter drainage as needed. The nephrostomy tube may be removed in 48 hours if upon clamping it, the ureteral and urethral catheters work well.

If the injury is high in the ureter and the distal portion cannot be utilized, the problem of crossed ureteroureteral anastomosis must be considered, or cutaneous ureterostomy. Anastomoses to the opposite ureter always poses the problem of subsequent stricture formation and possible eventual damage to both kidneys. Patients will not object so much to a colostomy as they will to cutaneous ureterostomy. However, in the case of the solitary kidney, there is no choice except ureterostomy; for implantation into the colon, assuming an anterior resection has been done, would markedly shorten the life of the kidney. Again, in case of colostomy, a uriniferous wet colostomy is unthinkable and cutaneous ureterostomy is preferable.

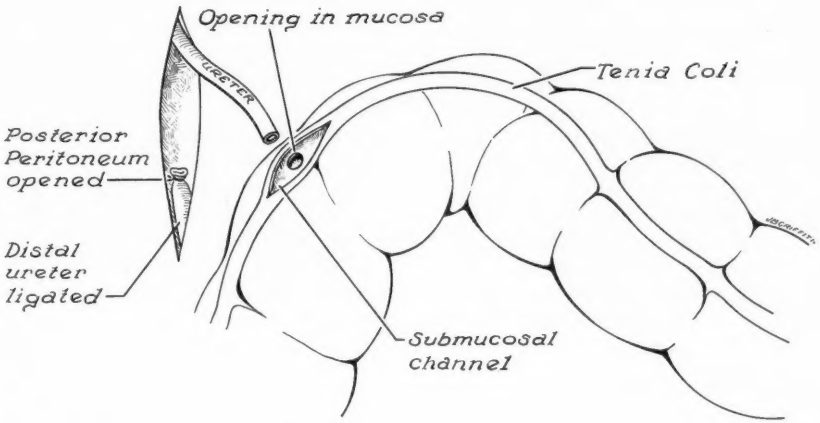
In suturing the ureter to the sigmoid or pelvic colon, investigators are agreed that the greatest hazards accrue from leakage, peritonitis, stricture and reflux. The Coffey #1 technique of drawing the ureter into the colon, or the Cordonnier technique of mucosa to mucosa suture offer greater hazard of leakage. The safer technique is to prepare in the colon a wide cuff of submucosal tunnel, suture the split ureter mucosa to mucosa, and then close the tunnel over the ureter as shown by Weyrauch and Young. De-suturing of the ureter has been reported by Moore-Smith on the third post-operative day. However, to intervene during the early post-operative period, if infection has occurred, is contra-indicated. Simple deligation over a splinting catheter may be done if detection is early and no damage has occurred to the ureter.

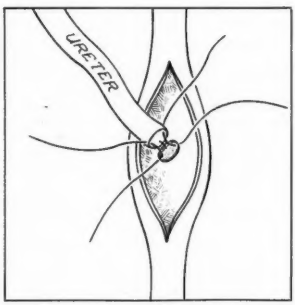
Bilateral ligation produces immediate severe symptoms of anuria and demands early deligation or bilateral nephrostomy. Injuries to the upper portion of the ureter are easier to repair than in pelvic portion; however, the incidence of injury of the latter is apt

URETERONEOCYSTOSTOMY

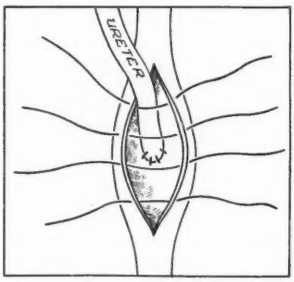


URETERO — SIGMOIDOSTOMY





Suturing mucosa to mucosa



Sutures to close submucosal channel over ureter

to be higher. Symptoms of injury may vary from little or no symptoms until a urinary fistula arises, to a very stormy post-operative course.

The intricacies of ureteral repair are such that it behooves us to avoid injury to the ureter. This is best done by obtaining reliable pyelograms preoperatively and thus assess the renal and ureteral relationships to the operative field, and to perform retrograde catheterization of the ureters, leaving the catheters in situ during the bowel resection. Should this be done routinely? There is no special contraindication if the urine is reasonably clear. Should the proctologist expand his specialty to include training in retrograde catheterization? The gynecologists in more progressive centers have done as much; then perhaps, this will be the most effective way to keep our type of practice inviolate and unregimented by giving maximum service at reasonable cost.

Certainly we are, or should be, as intimate with surgical details of the urological organs as the gynecologists, for we come as much in contact with the bladder and ureters in our work as they do.

Summary

Ureteral injuries may necessitate

1. **immediate ureterostomy or**
2. **nephrostomy**
3. **definitive surgery with**
   a. **uretero-ureterostomy over a splinting catheter**
   b. **crossed uretero-ureterostomy to opposite ureter**
   c. **uretero-vesical reimplantation (ureteroneocystostomy)**
   d. **uretero-sigmoidostomy or colostomy.**

A plea for prevention by performing retrograde ureteral catheterization is made.

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Vesical Dysfunction Following Rectal Surgery

P. H. McNULTY, M.D.
Chicago, Illinois

The incidence of serious vesical dysfunction following proctological surgery, though infrequent (about 7%), is alarming to the patients, troublesome to the surgeon and at times prolonged in its effect. Females are less prone to prolonged dysfunction than males, although there are times when an indwelling catheter must be worn for weeks to secure return of normal function. Rarely, if ever, is surgical aid necessary. The problem is complicated in males if vesical orifice obstruction due to prostatic hyperplasia or other pathology is present.

The problem is not easily disposed of because neither the neurology, muscular anatomy, nor physiology are completely known. "Pathways through which afferent impulses reach consciousness are unknown". (Bing and Haymaker, 1939)

For many years the work of Wesson was accepted as explaining the act of micturition. In brief this was understood to consist of a positive contraction of the detrusor muscle, which means the entire three layers of bladder muscle, accompanied by a positive contraction of the trigone or muscle of Bell, which pulled the vesical orifice open. Uhlenhuth has recently published a book on the anatomy of the pelvis, which is a report of an exhaustive study. Here a new concept of the anatomy and physiology of the vesical sphincter is presented. He describes sphincteric arrangement and function as is commonly understood elsewhere in the body.

The accepted innervation of the bladder consists of somatic, sympathetic and parasympathetic nerves and plexuses. The somatic innervation is the pudendal nerves derived from the second, third and fourth sacral segments, which transmit voluntary impulses. Sympathetic fibers are derived from the first and second lumbar and possibly the twelfth thoracic segments. These form the presacral nerve, which—at the sacral promintory—divides into two hypogastric nerves, which join the hypogastric ganglia, and the fibers are distributed

to the trigone, muscle of Bell, the crista and urethra. The parasympathetic nerves are derived from the second, third and fourth sacral segments,—form the pelvic nerve and hypogastric or pelvic plexus, and are distributed to bladder musculature or to detrusor muscle.

Lowraine E. McCrea, by studying serial sections of human embryos, has demonstrated that accessory series of nerve fibers exist and are distributed to the bladder musculature. These are derived from the second, third, and fourth sacral roots, lie in the deep layers of the endopelvic fascia along the veins and arteries of the lateral walls of the pelvis. These enter the bladder at the level of the insertion of the ureters, and completely circumvent the usual acknowledged pathway to the bladder through the inferior hypogastric or pelvic plexuses. These were found to radiate to the walls and dome of the bladder. It is thought that these nerves assume the function of innervation when the primary innervation has been removed. Thus, the bladder is supplied with two sets of innervation, either of which is capable of maintaining function.

The postoperative changes in the bladder consist of immediate complete retention of urine, and muscular relaxation with the formation of an irregular contour of the bladder. It is assumed that retention of urine following hemorrhoidectomy is reflex in origin as a result of trauma to the pudendal nerves, and is usually of short duration. This responds either to the use of drugs which stimulate the parasympathetic nerves or intermittent catheterization. Occasionally an indwelling catheter may be necessary for a few days.

An evaluation of the bladder function should be made before surgery is attempted. This may be done by rectal examination to determine the size of the prostate, catheterization following voiding to determine the absence of residual urine, and if necessary, cystoscopic examination to evaluate intravesical protrusion of the prostate, and if available, cystometric determination of the tone of the musculature. The avoidance of unnecessary trauma during the surgical procedure will cause less damage to the nerve supply.

Active treatment of retention of urine following surgery consists of placing an indwelling catheter in the bladder and the use of parasympathetic nerve stimulants such as furmathide. At times instillation of moderately irritating solutions into the bladder will stimulate muscular contraction. For this, 2% silver nitrate or merthiolate solution may be used. The use of hexamethylene, with the purpose in mind of forming formaldehyde within the bladder to stimulate contractions, has also been advised. The time at which the catheter should be removed can be determined by cystometric examination, or removing the catheter to determine if voiding is possible.

In cases in which prostatic hyperplasia is present before surgery, the possibility of returning function is lessened, and transurethral resection or some type of prostatectomy may be necessary. In cases in which definite hyperplasia is not present, and the function fails to return completely, transurethral resection of a small amount of tissue from the vesical orifice may re-establish the bladder muscle balance to allow voiding. Transurethral resections of the vesical outlet have

President's Page

THE PROBLEMS OF THE AGED AND CHRONICALLY ILL

Today there are an estimated 163,930,000 people in the United States. Since 1950, the population has increased over 13,000,000, and the Census Bureau estimates that by 1960 there will be more than 177,000,000 for whom the United States will have to provide. With this tremendous increase comes numerous and tremendous problems, no small one being that of the aged and chronically ill, 12% of our population.

In the past, a dependent or chronically ill person could find comfort and care within the confines of his family—whether the family performed the task personally or provided for the care in a convalescent home. Increasing industrialization and the growing complexity of our society have brought about the decentralization of the American family. Today, more often than not, the aged or chronically ill person finds himself cut off from his family. In this day of the inflationary dollar with the pittance received from old-age insurance and retirement plans, it is impossible to maintain a home, meet ordinary outside expenses, plus those cumbersome expenses imposed upon the aged and chronically ill. Only those with substantial private savings are able to spend their days in the many convalescent homes throughout the country. Thus, unable to turn to his family for care, this basically dependent person, aged or chronically ill, becomes the ward of the public.

The expense of keeping such people is almost prohibitive for the local and state governments. It is not likely that the states and cities can expect aid from the Federal government, considering the overwhelming National debt and the present confiscatory taxes. General hospitals are taxed to the limit with acute cases and chronic cases which cannot be moved, but to anticipate aid from the Federal government to even build much needed hospitals for the chronically ill is almost forbidden. The exceptionally high maintenance costs and lack of trained personnel for hospitals further aggravates the perplexing situation. The Eisenhower Federal Reinsurance Plan, which is a subsidy plan for cases of catastrophic illness, will not remedy the plight, but add a greater burden to the already overtaxed hospitals. However prohibitive the expense of keeping these "senior citizens" (as sociologists call the aged) and chronically ill, responsibility of the problem ultimately falls upon the local and state governments.

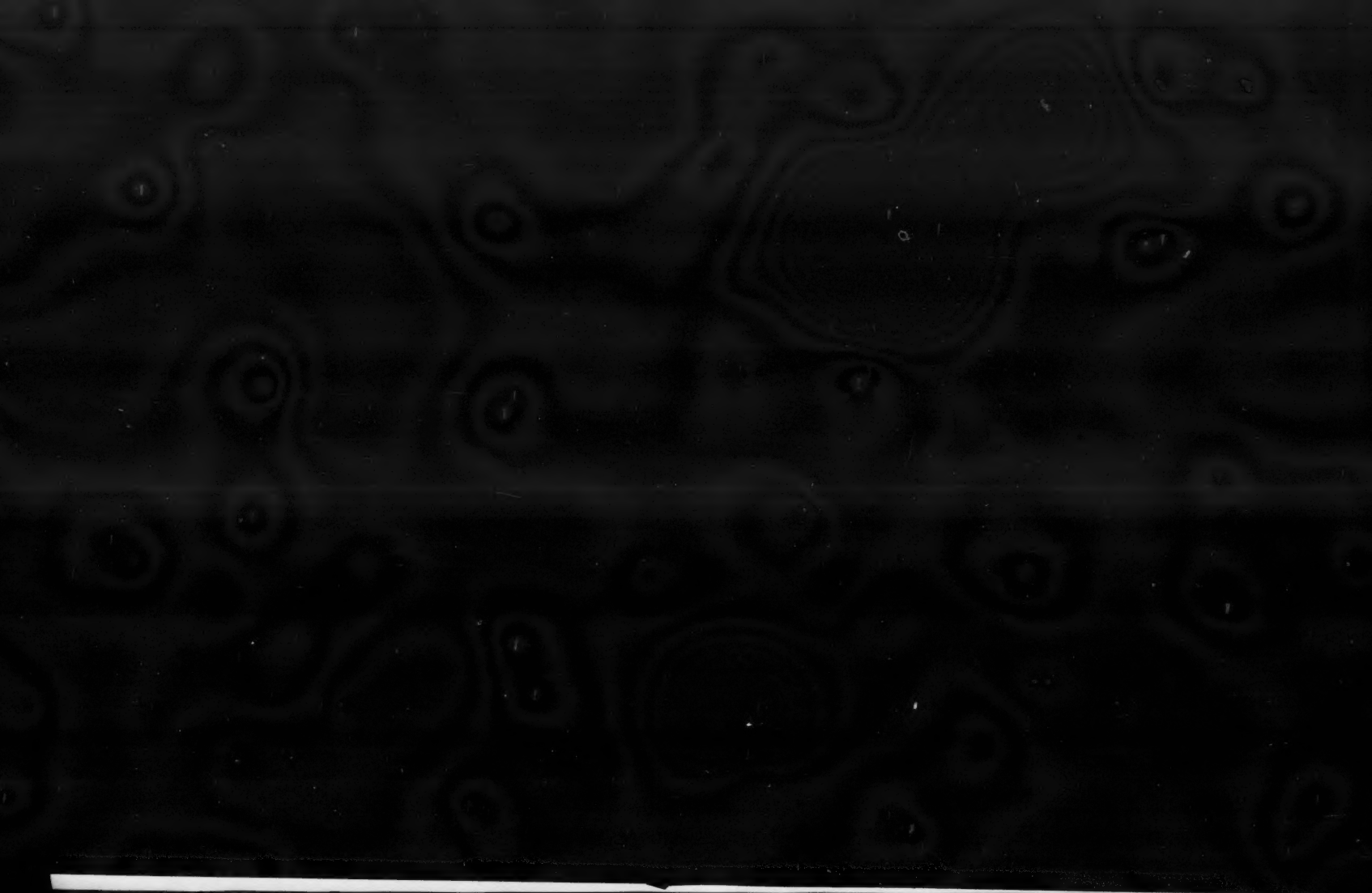
Creation of a "Vatican," like a community within a city, would solve this problem. A low rental housing project, plus other necessary facilities erected within a city and made available to the aged and chronically ill of all races and creeds, would

produce a self-sufficient community. Regular apartments for the physically capable, rooms for those who require nursing, and wards for the invalids would be augmented by a community center, a cafeteria, recreational and library facilities, and an administration building. Since medical care presents the biggest problem, a hospital unit (containing a sufficient number of beds to accommodate 10% of the total project population), a diagnostic clinic, and a rehabilitation center would be an integral part of the community. A physician, a nurse, and a social worker would be made available to the home patient; diagnoses would be made with the help of x-ray, electro-cardiographic, and basal metabolic-units supplied by the diagnostic clinic; care would be supplied by the combined services of visiting nurses, physical therapists, and home-makers.

Expense for such a project would not be great, considering encumbrance upon the present facilities. The initial cost to establish such a community could be provided by floating a bond issue over a long term period. Year to year expenses could be financed by nominal rents collected from a percentage of the dweller's pension, and much of the personnel needed for maintenance of the project could come from the tenants themselves. In this manner, the community is almost self-supporting. The difference, if any, between income and costs could be made up by a small grant from state and local governments. One thing is positive, however—the levy on the taxpayer is slight.

In summary, a low rental housing project for the aged and chronically ill, as projected, would make more hospital beds available because many of the acute cases treated at hospitals could be discharged earlier and continue treatment and convalescence at homes; it would minimize the need for building hospitals for the chronically ill, thus lessening the burden on the taxpayer. It would cut medical costs considerably. It would improve the mental condition of the aged by placing them in a homogeneous environment. Finally, it would, to a large extent, be self-supporting, with only nominal aid from state and local agencies.

Louis S. Wegryn, M.D.



been recommended by some and performed on women, and has been condemned by others. Usually observation over a sufficient period of time will accomplish satisfactory results in females without surgery.

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Invasive Pelvic Cancer

Isolated Ileal Segment As Urine Conduit After Pelvic Exenteration

CARROLL J. BELLIS, M.D.
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Curative surgery for cancer invading the bladder from the rectum, vagina, cervix, corpus uteri, or prostate, for primary cancer of the bladder, or for radionecrosis involving these organs, even without demonstrable tumor, may require cystectomy.

Since rectal cancer usually extends in the course of the superior hemorrhoidal vessels, lateral extension being encountered only in advanced lesions, wide lateral dissection, unlike that for carcinoma of the cervix, is unnecessary, the lateral plane of dissection being medial to the hypogastric artery and internal iliac vein. Cystectomy is required if the trigone cannot be preserved with an adequate margin of normal bladder wall. To evaluate the extent of necessary bladder resection, cystotomy with direct inspection and palpation of the trigone and ureteral orifices must be carried out. Such operations have evolved several methods of urinary disposal:

Bilateral cutaneous ureterostomy, because of the difficulty in collecting urine, of the skin excoriation, and of the stenosis of the ureteral orifices, is employed no longer for this purpose.

Uretero-sigmoidostomy proximal to a colostomy frequently has been followed by a high incidence of obstruction at the points of the anastomoses, eventuating in ureterectasis, hydronephrosis, and ascending infection manifest as pyelonephritis. Uremia and hyperchloremic acidosis from chlorid absorption[1, 2] develops in 80% or 85% of these patients. Urologists frequently make such a cloaca after cystectomy, although the constant drainage of a urine-feces mixture, responsible for the term "wet" colostomy, is abhorrent to a patient.

To avoid a "wet" colostomy and to utilize the urethra after total cystectomy in the experimental animal, Thompson[3] isolated a length of sigmoid, sutured one end to the trigone, closed the other end, and anastomosed the ureters to this substitute bladder (Fig. 1). Brun-

schwig[4] reported the use of this method in one patient with temporary success.

Anastomosis of the ureters to an isolated segment of sigmoid,[5] if the latter is available, circumvents blood chemistry imbalances, but the proximity of the urinary stoma to the terminal colostomy is undesirable (Fig. 2a). Because the electrolyte content of the intestinal secretion-urine mixture of an isolated intestinal segment[6, 7, 8, 9, 10] is lower than the electrolyte content of the "wet" colostomy feces-urine mixture, the development of uremia, hyperazotemia, and hyperchloremic acidosis is less likely after bladder substitution by an isolated segment. Hoping to eliminate the necessity for an external bag by forming a cecal reservoir with the aid of the ileocolic sphincter, Gilchrist[11, 12, 13, 14] iso-

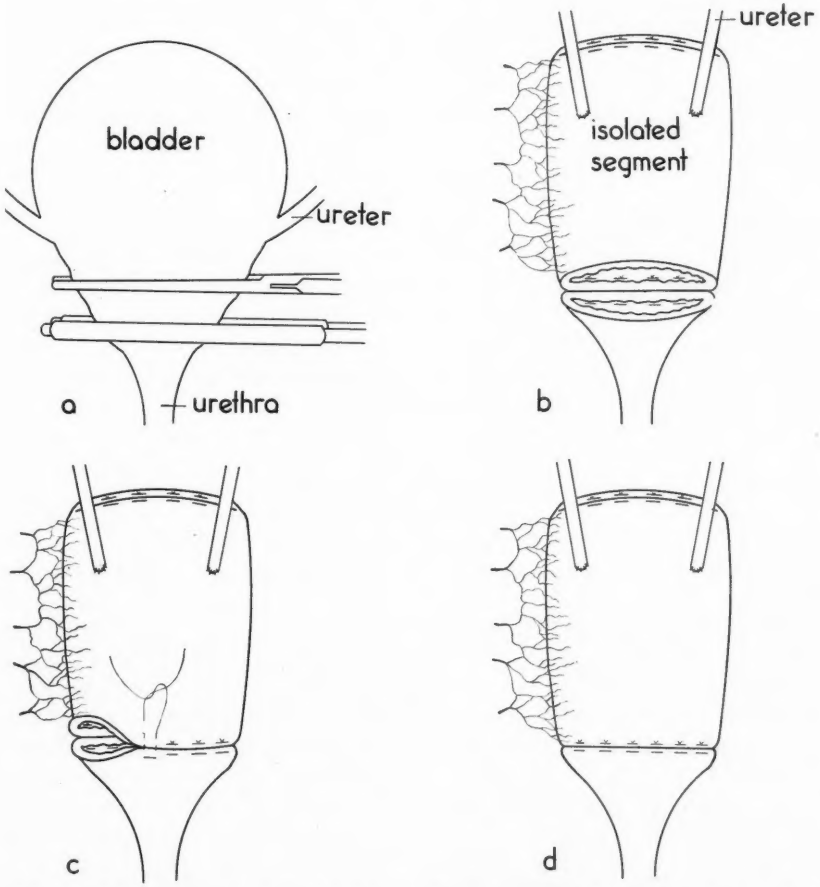

Fig. 1. Substitution of urinary bladder by isolated sigmoid loop sutured to urethra (Thompson).

lated a segment consisting of ileum, cecum, and ascending colon, reestablished continuity of the remaining intestine, anastomosed the ureters to the cecum, and made the ileal stump of the segment accessible for intermittent catheterization of the cecum (Fig. 2b). However, the ileo-cecal valve fails to retain urine in the cecal pouch, and continuous leakage of urine through the cutaneous stoma takes place just as it does through the cutaneous cecostomy of such an ileo-cecal segment, with the ureteral anastomosis made to the ileal portion[15] (Fig. 2c).

Recognizing that isolated intestinal segments of various configurations, designed as urinary reservoirs, fail of continence and become simply conduits, Bricker[16, 17, 18, 19, 20] used a short isolated segment of terminal ileum (which is well-situated for anastomosis to the

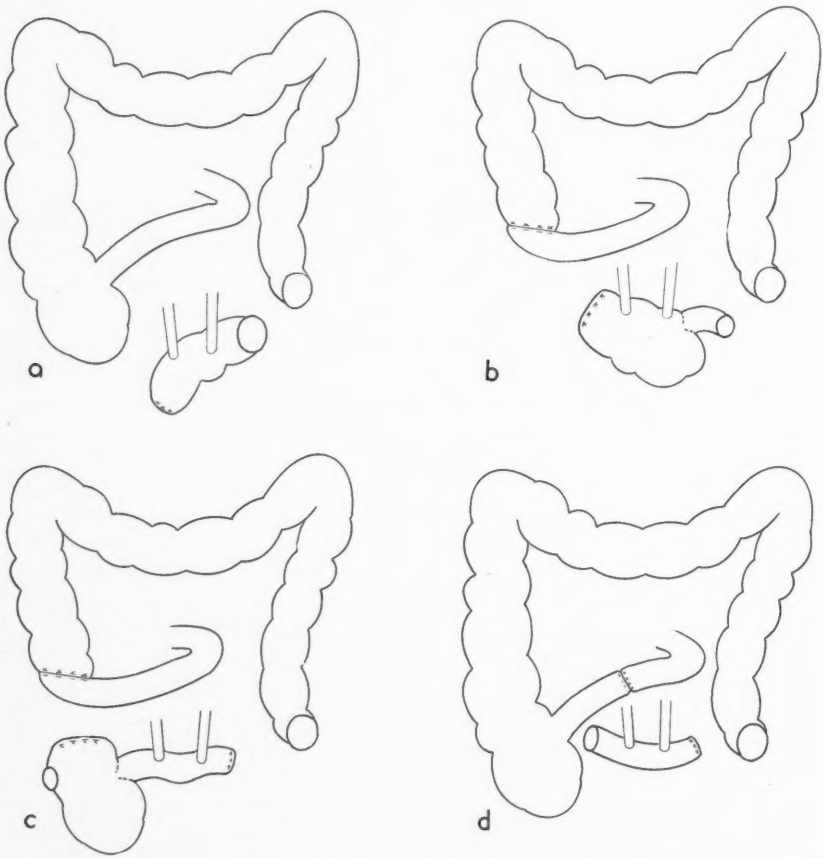

Fig. 2. Methods of ureteral disposition using isolated intestinal segments with abdominal wall stomas. a. sigmoid loop; b. ileocecal segment with ureterocecal anastomosis; c. ileocecal segment with uretero-ileal anastomosis; d. ileal segment.

ureters) as a urinary conduit after cystectomy, the small surface area of the segment contributing to the minimal absorption of urine constituents (Fig. 2d). My technique is simple, differing only in minor variations, and consists of the following steps:

(a) After pre-operative preparation with sulfathalidine and streptomycin, pelvic exenteration is carried out, and a terminal colostomy is made.

(b) During the abdominal portion of the operation, a six or eight inch segment of terminal ileum is isolated (Fig. 3a), the distal transection being about six inches from the cecum, with end to end anastomosis of the remaining bowel and closure of the proximal end of the isolated segment (Fig. 3b). Obviating their devascularization by dissection of only the most distal one or two centimeters from their normal positions, the ureters are sectioned near the aortic bifurcation and anastomosed by Cordonnier's non-tunneling method[21] (Fig. 4) to the side of the ileal segment with six or eight interrupted 5-0 chromic catgut sutures for the mucous membrane and six or eight interrupted 5-0 silk sutures for the adventitia-serosa, no ureteral catheters or splints being employed. The adventitia of the left ureter is sutured to the mesentery to prevent hernia.

(c) The distal end of the ileal segment is brought out to the right of the umbilicus as a cutaneous ileostomy, the mucosa of the ileum being sutured to the skin with interrupted 3-0 chromic catgut sutures, and the abdomen is closed. Construction of the ileal conduit occupies about one hour.

(d) The perineal portion of the operation is completed, obliterating the pelvic space by sutures, a large Penrose drain emerging at the coccygeal end of the perineal skin closure. Continual blood transfusion during the operation requires about 4000 cc.

An indwelling catheter maintains decompression of the ileal segment for three or four days, after which a Rutzen bag is used, the latter being detached every day for cleaning at the time of the patient's shower or tub bath. The accumulation of 60 cc. or 70 cc. of urine in the segment is followed by peristaltic emptying, the segment being a conduit, not a reservoir, without stagnation of urine.

During the past four and one-half years I have carried out this technique on ten patients, nine of whom were operated on for invasive pelvic cancer, and one for extensive radionecrosis, each patient walking in the corridors of the hospital within six hours after operation. There has been no clinical or roentgenographic evidence of late post-operative ureterectasis or nephropathy. Nine patients were alive and clinically well on 1 July 1954; one patient succumbed to metastases four years after operation. Following is the diagnosis and operation in each of the ten cases:

1. Woman, 62 yrs. Cancer of sigmoid with previous segmental resection of sigmoid. Recurrence distal to anastomosis with invasion of bladder. Operation: abdomino-perineal proctosigmoidectomy, hysterectomy, cystectomy, colostomy. Death four years later with metastases.

2. Woman, 65 yrs. Cancer anterior rectal wall with involvement of vagina. Operation: abdomino-perineal proctosigmoidectomy, hysterectomy, vaginectomy, cystectomy, colostomy.

3. Woman, 77 yrs. Cancer of recto-

sigmoid with invasion of vagina, bladder, and ileum. Operation: abdomino-perineal proctosigmoidectomy, vaginectomy, resection of ileum, cystectomy, colostomy.

4. Woman, 81 yrs. Cancer of cervix with extensive radionecrosis of anterior and posterior vaginal wall and vesico-vaginal and recto-vaginal fistulas. Operation: abdomino-perineal proctosigmoidectomy, hysterectomy, vaginectomy, cystectomy, colostomy.

5. Woman, 64 yrs. Cancer of cervix with invasion of bladder and recto-sig-

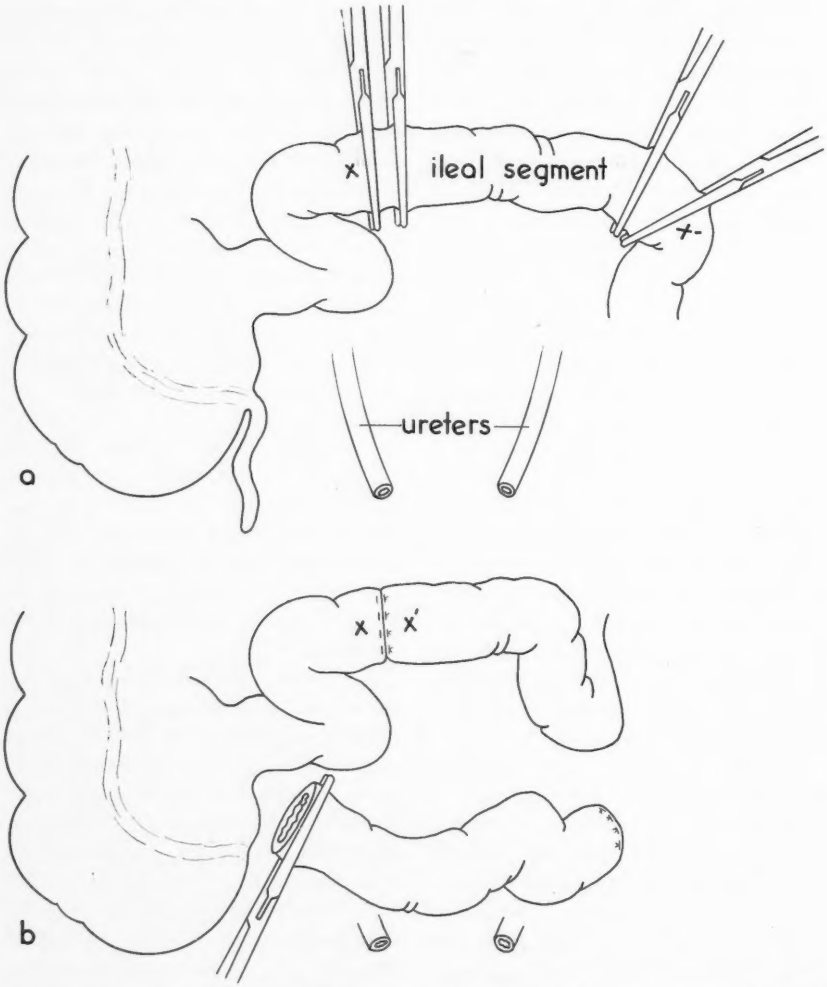

Fig. 3. Isolation of terminal ileal segment for urine conduit. a. segment isolated for transection; b. continuity re-established; proximal end of isolated segment closed.

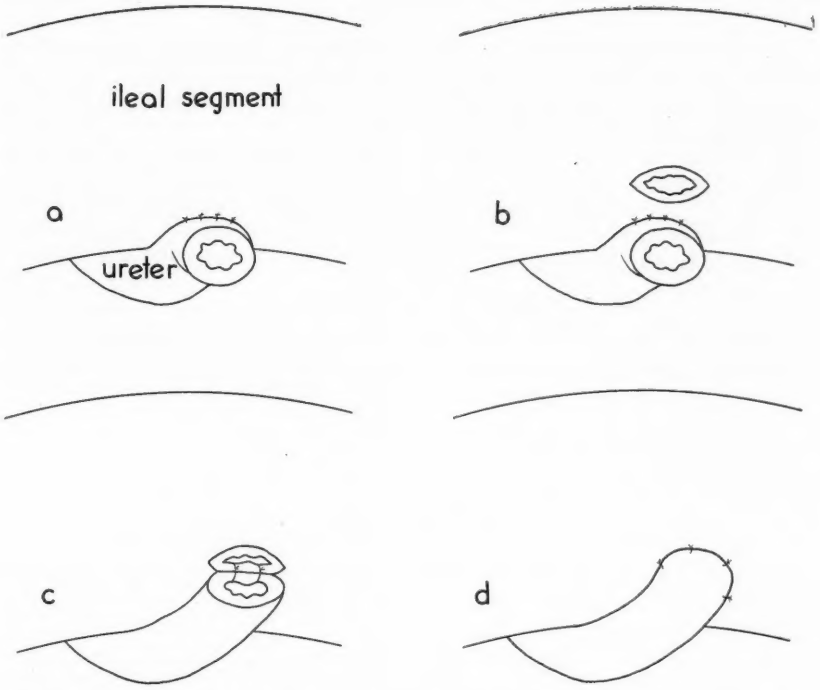

Fig. 4. Ureteral-ileal segment anastomosis (Cordonnier). a. inner serosa-adventitia approximation; b. incision of ileal segment; c. full thickness sutures; d. outer serosa-adventitia approximation.

moid. Operation: Abdomino-perineal proctosigmoidectomy, hysterectomy, vaginectomy, cystectomy, colostomy.

6. Man, 55 yrs. Cancer of bladder with invasion of recto-sigmoid. Operation: abdomino-perineal proctosigmoidectomy, cystectomy, colostomy.

7. Woman, 68 yrs. Total colectomy, rectal stump remaining, with terminal ileostomy three years before for polyposis coli with multicentric carcinoma. Cancer of bladder with invasion of ileum and rectal stump. Operation: abdomino-perineal proctectomy, hysterectomy, vaginectomy, cystectomy; ileal urinary conduit from segment isolated proximal to ileostomy previously established in left lower abdomen.

8. Woman, 72 yrs. Cancer of corpus uteri with invasion of bladder and sigmoid. Operation: abdomino-perineal proctosigmoidectomy, hysterectomy, vaginectomy, cystectomy, colostomy.

9. Man, 68 yrs. Cancer of rectum with invasion of trigone. Operation: abdomino-perineal proctosigmoidectomy, cystectomy, colostomy.

10. Woman, 56 yrs. Abdomino-perineal proctosigmoidectomy with left lower abdominal colostomy for cancer of rectum 1 year before. Cancer of bladder. Operation: hysterectomy, cystectomy.

Summary

Curative operation for invasive cancer of the rectum or its contiguous organs may necessitate cystectomy. In addition to producing serious systemic chemical inbalances and often fatal nephropathy, the liquid cloacal mixture of the conventional "wet" colostomy is hygienically objectionable. Ureteral anastomosis to an isolated ileo-cecal segment intended as a continent urine reservoir does not result in a competent valvular device and fails to assure against acidosis and ascending urinary tract infection.

Bricker's method of anastomosing the ureters to the side of an isolated ileal segment, whose proximal end is closed, the distal end forming a cutaneous ileostomy, creates a conduit for urine, emptying intermittently without catheterization. Ten such cases which required cystectomy during pelvic exenteration are presented, apparently with good results in nine, with one death four years later.

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Unusual Benign Lesions of the Cecum

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The anatomy and physiology of the cecum tend to render many diseases of this structure asymptomatic in their early stages. The liquid nature of its contents and its wide diameter preclude early obstruction. The long distance from the cecum to the anal canal may obscure changes in function. Bleeding into the cecum may not be recognized because of changes in the blood as it passes from the anus. Inflammatory complications may produce symptoms and physical findings which are difficult to interpret. This paper does not deal with the usual lesions of the cecum, but we wish to present some unusual problems which have taxed our diagnostic and therapeutic ingenuity. We believe a review of these problems may serve as a reminder that unusual lesions of the cecum must be thought of in bizarre abdominal pathology. The symptomatology and physical findings in diseases of the cecum are less diagnostic than of most other parts of the gastrointestinal tract.

This paper is based on the report of thirty unusual benign lesions of the cecum in which the diagnosis was established by roentgenographic findings, by laboratory studies, by operative diagnosis and by autopsy. Twenty-seven patients with unusual lesions of the cecum have been selected from many thousands of patients admitted to the Veterans Administration Hospital, Hines, Illinois, over an eight year period. Three private patients of the senior author have been added to this series because of their particular interest. This study includes only those patients in whom the lesions were located in the cecum and were not a part of a generalized disease. All patients with any malignant disease of the cecum, and with diseases associated with appendicitis, have been excluded. The majority of patients were males in the Veterans age group. An effort has been made to

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Fig. 1. Barium enema in eight-year-old child revealing non-descent of the cecum with cecum and appendix lying in the right upper quadrant of the abdomen.

classify these lesions of the cecum as follows:

Congenital Anomalies
Inflammatory Lesions
Granulomatous Lesions
Benign Tumors

Anomalies of the Cecum: Sixteen of our thirty cases were classified in this group. They may be divided into congenital and acquired anomalies. Congenital anomalies may be further classified into abnormalities of position and abnormalities of structure.

Abnormalities of the position of the cecum may result from failure of the normal rotation and descent of the cecum in the embryologic development of the alimentary tract. We encountered three such cases in our series. In one of these the ileum entered the lateral rather than the medial side of the cecum. In two patients the cecum had failed to descend into the right lower quadrant. Such an abnormality in itself may not produce symptoms. However, these congenital anomalies often are accompanied by other abnormalities producing symptoms. In one case, where the cecum failed to descend into the right lower quadrant, the child had constipation, nausea and vomiting since birth. This resulted in poor nutritional development. The anatomic position of the cecum in the right upper quadrant was revealed by barium enema. (Figs. 1 and 2). This demonstrated the cecum to be under the superior surface of the liver with the appendix extending upward and anteriorly to the under surface of the liver with the ascending colon re-duplicated upon itself. The

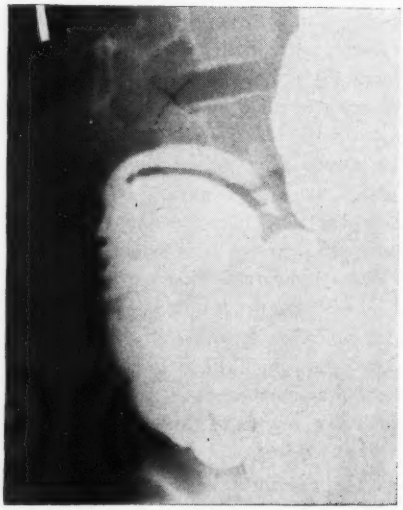

Fig. 2 Same patient as Fig. 1. Lateral roentgenogram revealing reduplication of the ascending colon. The cecum and appendix are lying in the right upper quadrant.

terminal ileum was bound down by congenital bands making a portion of this structure retroperitoneal. These bands were severed, the terminal ileum freed, the appendix removed and the cecum was anchored in the right lower quadrant. (Fig. 3). Her symptoms had been produced by intermittent partial bowel obstruction secondary to the congenital abnormality. Since operation, the symptoms of obstruction have been totally relieved and the child has developed normally.

Congenital abnormalities of structure which we have encountered consisted of solitary diverticula of the cecum unassociated with diverticula of other portions of the intestinal tract. That this is a separate pathologic entity has been pointed out by others[1,5,7] and was substantiated in our cases. Three of the diverticula were incidental findings since they were uncomplicated by inflammatory changes. (Fig. 4). Each of six patients in our series had inflammatory changes in a diverticulum of the cecum. These patients all complained of severe cramping abdominal and right lower quadrant pain. There was no associated nausea, vomiting or change in bowel habits. Diagnosis was established in each at operation. (Fig. 5). In four, perforation of the diverticulum had occurred. In two cases, a fecolith was impacted in the diverticulum.

Fig. 4. Incidental finding of solitary diverticulum on the antero-lateral surface of the cecum.

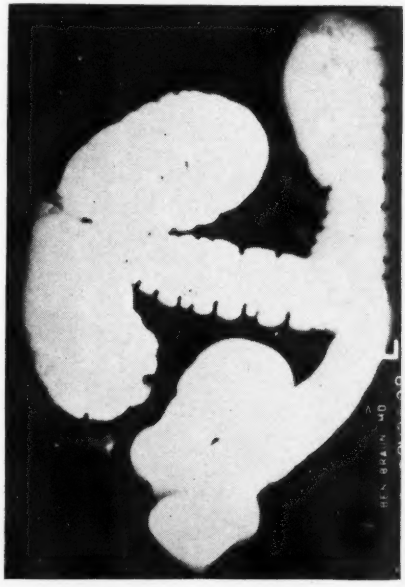

Fig. 3. Postoperative barium enema of child as seen in Fig. 1. This demonstrates redundancy of the large bowel, but cecum is now in its normal position.

Acquired anomalies of the cecum may be spontaneous or secondary to some previous surgical procedure. In our series spontaneous acquired anomalies of the cecum consisted of three cases of intussusception. The involvement of the cecum in these cases was

coincidental, the cecum being the intussuscipiens in each case. One patient presented an intussusception of a Meckel's diverticulum into the cecum. A second proved to have an intussusception of the ileocecal valve within the cecum. The third case presented an intussusception of the appendix with the formation of an inflammatory mass within the cecum. This patient had symptoms for many years which were thought to be due to a peptic ulcer and later were considered to be of psychosomatic etiology. Finally, however, abdominal exploration revealed the intussuscepted appendix. (Fig. 6). This and the inflammatory mass were locally excised and the cecum closed. The patient's symptoms were completely relieved by the operation.

Anomalies of the cecum occasionally occur secondary to previous operative procedures. There was one such case in our series. This patient had had an appendectomy performed many years previously through a right McBurney's incision, the appendix apparently being found in its normal position. Following a number of other operative procedures for intra-abdominal disease, the patient was re-operated for symptoms of acute intestinal obstruction. At operation, the cecum was found densely adherent to the diaphragm in the left upper quadrant where perforation had occurred in a gangrenous portion of the dilated cecum.

Inflammatory lesions of the cecum other than those associated with appendicitis are comparatively rare. Most frequently, these inflammatory lesions are not limited to the cecum but can occur in all parts of the bowel. However, we encountered nine cases in which the disease was limited to the cecum. Such lesions may be of specific

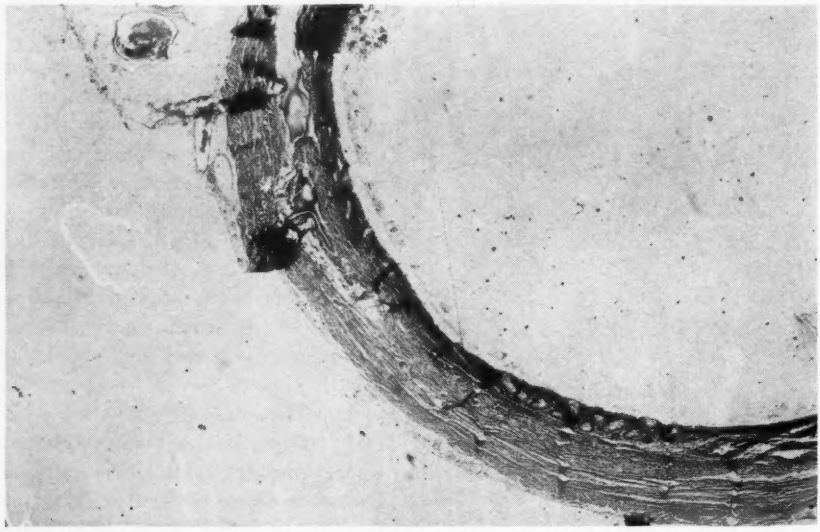

Fig. 5. Photomicrograph demonstrates wall of diverticulum showing inflammatory changes. It is noted that this is a true diverticulum, i.e., muscularis is present.

Fig. 6. Photograph of intussuscepted appendix with probe in lumen of the appendix, and demonstrating inflammatory mass found in the cecum.

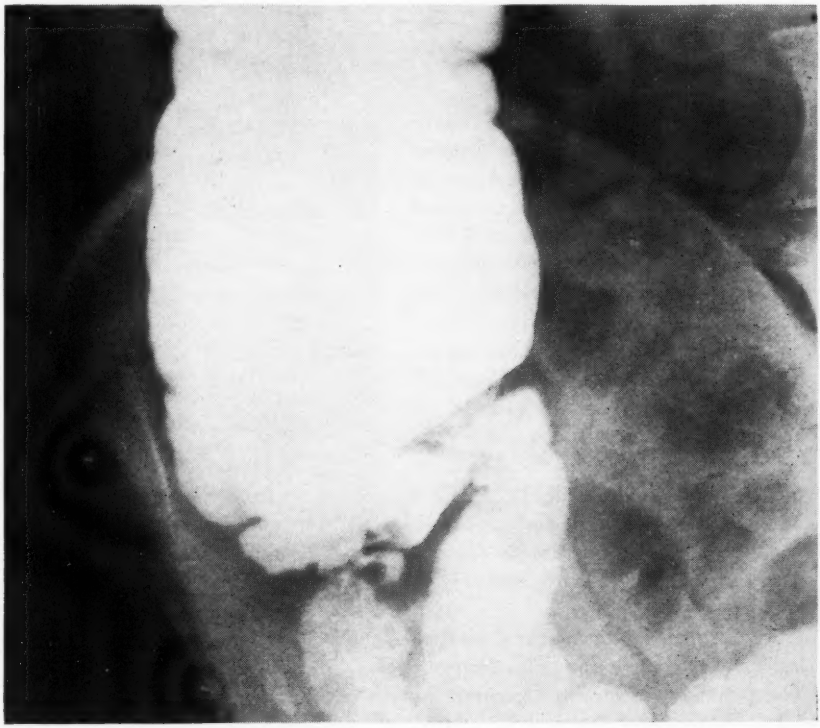

Fig. 7. Typical findings of inflammatory induration and "coning" of the cecum as seen in amebiasis.

Fig. 8. Roentgenogram of amoeboma of cecum.

or non-specific etiology.

Of the specific lesions which we have encountered three patients had granulomatous-type lesions of the cecum due to amebiasis. Wilbur and Camp stated that they found an incidence of 27.2 per cent of cecal lesions in patients with amebiasis. Two of our patients, both of whom had a severe bloody diarrhea, presented abnormalities of the cecum by roentgenogram. (Fig. 7). The third patient was operated for supposedly an acute appendicitis, but a mass was found in the cecum. (Fig. 8). The diagnoses were established by finding amebae in the stools or by a long-standing history of proven amebiasis. All three patients responded to anti-amebic therapy.

Two patients had granulomatous type lesions of the cecum due to tuberculosis. Today tuberculosis of the cecum, not associated with pulmonary tuberculosis, is a very rare disease. One of our patients presented such a lesion. He gave a history of intermittent cramping abdominal pain over a period of three years. Repeated gastrointestinal x-rays had failed to reveal the cause of his symptoms. Finally a barium enema revealed a deformity of the cecum. (Fig. 9). At operation, an extensive granulomatous mass was found in the cecum and a portion of the terminal ileum. This portion of the diseased bowel was removed and an ileo-transverse colostomy performed. Microscopic studies of the lesion demonstrated a granuloma in which tubercle bacilli were found.

Talcum powder is known to produce granulomatous lesions in the peritoneal cavity. This is due to the property of piezo-electricity which is manifest when stress is applied to crystals which have an asymmetrical arrangement of the

Fig. 9. Barium enema of a tuberculous granulomatous mass of the cecum and a portion of the terminal ileum. Note similarity of appearance of the cecum in this case to the x-ray of the patient with amebiasis (Fig. 7).

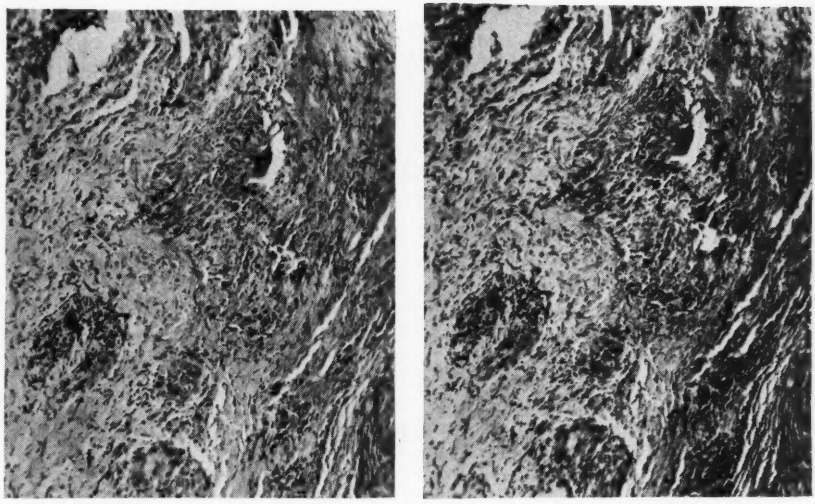

Fig. 10. Talc granuloma of the cecum as reviewed under natural light (left) and polaroid light (right). It is noted on the right that the talcum crystals stand out more prominently.

atoms within their molecules. These substances with the property of piezoelectricity, such as talcum powder, produce a proliferative cellular response when introduced into any tissues of the body.[2] One of our patients who had had previous abdominal surgery developed symptoms of incomplete bowel obstruction. At operation a granulomatous lesion of the cecum was found. Following resection, microscopic studies of the lesion under polaroid light demonstrated talcum crystals. (Fig. 10).

We have encountered three patients with non-specific granulomas of the cecum. One of these developed at the site of the inverted stump of a previously removed appendix and was an incidental finding at the time of a ventral hernia repair. Malbin called attention to the fact that this condition can simulate a cecal polyp on roentgenogram examination. The other two nonspecific granulomas were found at operations for what was thought to be acute appendicitis. Postoperative studies did not reveal the etiology of these lesions. The patients were treated only with antibiotics and follow-up studies at a later date revealed no evidence of disease of the cecum.

Benign tumors of the cecum are comparatively rare. Helwig in his investigations found at autopsy an incidence of 2.8 per cent of benign tumors of the cecum. Adenomas of the cecum comprised 78 per cent of these tumors or 2.2 per cent of the total. We encountered five tumors of the cecum. Three of these were carcinoid tumors. The patients were all moderately cachetic and complained of cramping abdominal pain. Diagnosis was not established in any case until operation was performed. Only palliative procedures could be

Fig. 11. Barium enema with a marker over the leiomyoma in the right lower quadrant. This demonstrated that the mass was extrinsic to the lumen of the bowel.

performed because of the presence of extensive metastases.

Leiomyomata have been reported arising in all portions of the gastrointestinal tract.[3] One of our patients had a leiomyoma of the wall of the cecum. He was asymptomatic except for a palpable five centimeter mass in the right lower quadrant of the abdomen. (Fig. 11). Because simple excision of the mass would have compromised the blood supply to the cecum and ascending colon, a right hemicolectomy was performed.

Usually papillomata of the bowl are thought to be relatively painless. However, one of our patients had a benign papilloma of the cecum associated with severe, intractable pain. When this patient was first seen she was complaining of severe pain on the right side of the abdomen unrelated to any gastrointestinal activity. She had lost considerable weight and was tender in a small area in the right lower quadrant of the abdomen. Repeated studies of her gastrointestinal and urinary tracts failed to reveal any cause for her complaints. After eight months of increasingly severe pain, another barium enema revealed a filling defect in the cecum. (Fig. 12). At operation, because the cecum felt boggy and adjacent mesenteric lymph nodes were enlarged, a right hemicolectomy was performed. Histologic examination revealed a benign papilloma of the cecum with ap-

Fig. 12. Spot view over the cecum revealing the defect noted in patient with painful papilloma of the cecum.

Fig. 13. Cross section of benign papilloma of cecum.

parent involvement of the nerve plexuses at the base of the pedicle. (Fig. 13). The patient has been free of pain since her operation.

Conclusions The symptoms presented by these thirty patients were not specific for the type of lesion encountered. However, the altered physiology produced by the lesion does explain the symptomatology. Their symptoms were based on one or more of the following: Reduction in size of the lumen of the bowel, response to inflammatory changes and involvement of adjacent nerves. Reduction in the size of the lumen resulted in colicky pains, nausea, vomiting and distention, the stigmata of obstruction. The response to inflammatory changes resulted in fever, pain, tenderness and hypermotility of the bowel with occasional diarrhea. Involvement of the adjacent nerves resulted in pain. Thus, the key to diagnosis of these lesions lies in an awareness of the possible disease entities combined with adequate physical and laboratory examinations.

Summary

A series of thirty unusual benign lesions of the cecum are presented. Résumés of the histories and findings of a number of patients reveal a variety of benign pathologic diseases. An attempt to correlate the symptomatology with the nature of the lesions encountered proved unsuccessful. The symptoms usually resulted from altered physiology and were not specific for each disease entity.

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Clinical and Laboratory Evaluation of Alcoholic Beverages

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While many persons express the belief that particular types of distilled spirits produce hangover or other side effects, there is only fragmentary scientific information available on this point. It is definitely established that ethyl alcohol produces many after-effects associated with intoxication; some reactions, however, are thought to be due to the presence of higher alcohols commonly found in distilled alcoholic beverages. Allergice reactions, gastric intolerance, hangover, have been invoked by consumers as being the reason for their preferences or dislikes concerning particular drinks. In most instances the amount consumed, the relationship to meals and other controlling factors, are disregarded. When drinking is very moderate, untoward reactions are usually absent, regardless of the type of alcohol consumed. If larger amounts are used the nature as well as the dilution and the rate of intake of the beverage influences the immediate and delayed result.

The present study was undertaken in an effort to establish the difference in effect produced by distilled spirits of various types and to ascertain if these effects were due to factors other than their content of ethyl alcohol. Bourbon, Rum, Gin and Vodka were used for the test. Adjustment in the administered dose was made for the variation in alcoholic content or proof, the amount given each subject consequently was uniform and contained three ounces of ethyl alcohol. Dilution with water, rate and time of drinking, as well as relation to meals, were the same in all cases. Since the same subjects were given the different drinks under similar conditions it was felt that individual tolerance factors might be eliminated. The flavor, the amount and variety of contained congeners were the variables that we feel

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Table I

	Total Acids	Esters	Aldehydes	Furfural	Fusel Oil	Tannins
Straight Whiskey	65.	41.5	5.8	1.8	136.00	45
Vodka	2.4	10.56	0.45	—	1.06	—
Gin						
Rum	78.5	420.	20.	6.0	110.00	—

would possibly produce a measurable difference in effect.

Congeners are found in all distilled spirits; the above table (Table I) shows their average amount and compositions in the various beverages under study.

There is considerable evidence in the literature regarding the toxicity of the various congeners. One of the earliest studies that of Dujar-din-Beaumitz and Audige indicated that in pigs, feeding with pure alcohol produced no harmful effects on the digestive organs, whereas the animals given an equal quantity of imperfectly purified spirit showed considerable damage to the viscera. Brunton and Tunnicliffe demonstrated the toxic action of Furfural—0.06 grams of this material is reported as causing persistent headache; 30 cc. of Fusel Oil has caused death in man.

Joffrey and Serveau, in 1895, found that the effect of congeners was additive to that of alcohol. Amyl alcohol is reported to be 15 times as intoxicating as ethyl alcohol. Since definite information was lacking regarding the toxicity of most of the congeners, animal tests seemed advisable.[2,3]

Pharmacology Mixtures of congeners corresponding to the amounts found in various spirit as shown in the above table were prepared and tested in animals for their relative toxicity.

In mice, rats and rabbits, administration of these mixtures by intraperitoneal, intravenous and oral routes did not give any indication that one mixture was more toxic than another; the total amount given was the controlling factor. Since this was found to be the case, one mixture was employed in determining the acute oral toxicity (LD50) in rats. Table II below gives the composition of the test material which is an average of that found in straight whiskey:

The estimation of the acute oral toxicity (LD50) and its standard error were calculated in accordance with the method of Miller and Tainter. The results (and for procedure) are given in Table III.

The acute LD50 in rats—namely 926-285 milligrams, represents the amount found in approximately ⅓ litre of whiskey.

Clinical Gin, Rum, Vodka and Bourbon were used in the clinical test.

Table II

Total Acids (Acetic)	Esters (Ethylacetate)	Aldehydes (Acetaldehyde)	Furfural	Fusel Oil	Tannins
6.5	41.5	5.8	1.8	136	45

Representing Grams per 100 liters.

Table III

SUMMARY OF OBSERVATIONS IN ORAL (RAT) TOXICITY TEST OF A SAMPLE OF FUSEL OIL

Dose[1]	Number of Rats and Sex	Average Body Weight[2] —days— 0	14	Symptoms[3]	Number of Deaths —days— 1	2	3	more than 3	Mortality[4]
Mg./kg.		—grams—							
256	5M, 5F	225 (231)	248					2	2/10
512	5M, 5F	227	239				1	2	3/10
1024	5M, 5F	219	233			2	1	3	6/10
4096	5M, 5F	226	281	AIPN	6	1			7/10
5792	2M, 2F	217	—	AIPN	8	1	1		10/10
8192	2M, 2F	213	—	AIPN	4				4/4

[1] Sample administered as received.
[2] Figures in parentheses show average initial weight of survivors.
[3] Symptoms: A = abdominal pain; I = incoordination; N = nasal irritation; P = paralysis.
[4] Mortality ration = number of deaths per number of rats in group.

The amount given depending on proof was equivalent to three ounces of ethyl alcohol, mixed with sufficient water to make 12 ounces. The test drink was consumed in 20 minutes. In addition to physical findings the following were checked at intervals of 1 hour, 2 hours, 3 hours, and 12 hours.

Memory	Walking
Judgment	Pick Up
Orientation to time	Balance
and space	Writing

Alcohol blood levels were taken 1 hour and 2 hours. The degree of hangover was determined the following morning. Electrocardiograms were done 1 hour after the beverage was taken; also Ergometric tests were conducted before and 1 hour after drinking the tests drinks. These tests showed no definite pattern.

Table IV summarizes the findings relative to the above.

Hangover was diagnosed on the basis of either subjective or objective findings not previously found.

The hours and character of sleep during the night, the presence of headache, indigestion, nausea, anorexia and excessive thirst were considered signifi-

Table IV

	Number of subjects	20			Test doses given	80		
	Rum		Gin		Vodka		Bourbon	
Degree of Intoxication	92%		90%		84%		89%	
Alcohol Blood Level	1 hr.	2 hr.	1 hr.	2 hr.	1 hr.	2 hr.	1 hr.	2 hr.
	.26	.23	.25	.21	.22	.17	.25	.23
Hangover	19y	1n	17y	3n	2y	18n	16y	4n

cant. The presence of tremor, visible nervousness, depression and subjective feeling of hangover were also included.

Discussion Many investigations have been made regarding the immediate and delayed effects of drinking distilled spirits. It is rather surprising that so little attention has been given to the type of beverage consumed. Our results indicate that there are definite differences produced by some spirits and that these differences are probably produced by the congeners they contain. With Rum, Vodka, Gin and Bourbon whiskey there was some variation in the degree of intoxication produced. However, a very marked difference was noted in the frequency of after-effects, especially in the case of Vodka. While the actual quantity of congeners in 6 ounce of 100 proof straight whiskey is small, i.e., approximately 0.7 grams, the toxicity of these substances is such that it offers a probable explanation of the results obtained. Vodka, as shown in the table, contains approximately one tenth of the amount of congeners found in Rum, Whiskey and Gin.

In animals the relatively small lethal dose produces signs of intoxication with abdominal pain, nasal irritation. and incoordination. Death was caused by pulmonary hemorrhage and corrosive effect on the gastro-intestinal tract. Dilution of these substances reduces the toxicity of this material to some extent, but even in the dilutions found in whiskey for example, they remain extremely toxic.

Conclusions

1. The consumption of alcoholic spirit containing the equivalent of three ounces of ethyl alcohol produces definite objective and subjective evidences of intoxication, even in subjects with acquired tolerance.

2. Rum, Bourbon and Gin, representing this amount of alcohol, produce a somewhat greater degree of intoxica-

Table V

FUSEL OIL MIXTURES - LD/50 TRIALS
ABSTRACT

A. Solution #1
1. Mice—(25 gms)
   a) Intraperitoneally—LD/50 = 1.42 dilution:
      weight = 0.48 gm = 0.5 ml/Kg
2. Rats—(75 gms)
   a) Intraperitoneally—LD/50 = 1.7 dilution:
      weight = 0.96 gm = 1 ml/Kg
   b) Orally—LD/50 = 1:2 diluition:
      weight = 0.72 gm = 7 ml/Kg
3. Rabbits—(2800 gms) exploratory on 6 rabbits
   a) Intravenously—LD/50 = 1:11:
      weight = .0155 gm = .016 ml/Kg

B. Solution #2
1. Mice
   a) Intraperitoneally—LD/50 = 1:46 (Similar to #1 solution)
2. Rats
   a) Intraperitoneally—LD/50 = 1:7 (Similar to #1 solution)
   b) Orally—LD/50 = 1:2 (Similar to #1 solution)
3. Rabbits—no intravenous runs

tion than does Vodka.

3. The frequency of "hangover" as evidenced by signs and symptoms was definitely less with Vodka than with the other beverages tested.

4. Based on the toxicity of the congeners in distilled spirits, results indicate that these substances play a role in both the immediate and after-effects experienced by drinkers.

This report describes the estimation of the acute oral toxicity (LD50) for rates of a sample of orange-brown, aromatic fluid submitted for examination on July 29, 1954. The sample bore a label of "Sias Laboratories" with the inscription: "Fusel Oil, Sol'n No. 1 (20 x Wt.)." A certain amount of deposit was seen on the walls of the brown glass bottle in which the sample was submitted, but in accordance with instructions it was ignored and the tests were conducted on the clear fluid.

Procedure Fifty-four healthy young adult albino rats bred in these Laboratories served as experimental subjects. The test groups consisted of 4 rats in the exploratory ranges, and 10 each at the critical levels. Equal numbers of males and females weighing 225 ± 25 grams were assigned to each group. Test doses of the undiluted sample were administered intragastrically following an 18 ± 2 hour fasting period during which access to water was allowed.

After administration of test doses, the rats were returned to individual cages and allowed free access to a nutritionally adequate stock ration and fresh tap water. They were observed for a two-week period during which records were kept of body weights, appearance, behavior, and mortality.

Representative rats that died and survivors that were sacrificed were examined at autopsy.

The LD50 and its standard error were calculated in accordance with the method of Miller and Tainter (Proc. Soc. Exptl Biol. and Med., 57,261, (1944)).

Results The symptoms observed included abdominal pain, nasal irritation, incoordination, and paralysis. Deaths tended to occur earlier with increasing levels of dosage; survivors at all dose levels grew normally.

The growth and mortality data are summarized in the accompanying table.

The major gross abnormalities observed at autopsy were pulmonary hemorrhage and irritation of the mucose of the stomach and intestinal tract, as evidenced by astringent, corrosive effects, and in some cases accompanied by focal hemorrhage.

Conclusion

The acute oral LD50 for rats of the sample identified as "Fusel Oil, Sol'n No. 1 (20 x wt)" is estimated to be 926 ± 285 milligrams per kilogram of body weight.

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Pruritus Ani
Pilonidal Cysts

New Concept in the Etiology and Treatment

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Pruritus ani remains an enigmatous condition. In reviewing the literature we find listed a real barrage of causes; a barrage that precludes the possibility of omission but gives no specific explanation of this condition. We feel with Parker Hayden,[1] "The cause and cure of which are not known, and the remedies of which are legion." We offer this concept as an explanation, in many cases, of the etiology of pruritus ani, and we believe that the validity of our concept is attested by our own personal experience.

We believe that in many instances pruritus ani is due to fragmentation of perianal hairs and the lodging of these fragments in the anal canal while wiping after defecation. The obvious remedy is cleansing of the anal canal. Emphasis must be made on cleansing of the anal canal in its entirety, for cleansing of the perianal region is insufficient. When this is done fragments of hair from two to five mms, or longer, will be found, and removal of these fragments will give complete relief until the cycle repeats itself.

While discussing this region, we also have a helpful hint in the treatment of pilonidal cysts. We excise pilonidal cysts completely after injecting these cysts with methylene blue, and the skin is immediately closed over a Penrose drain which is brought out through the cephalad portion of the incision.

Our method of closure is to insert both deep retention sutures and superficial ones. The deep ones embrace all the tissues and are anchored into the fascia of the sacrum and coccyx. These sutures we permit to remain for twenty days, the drain being removed after seven days.

We contend that we have a slowly granulating almost avascular dead space, which is almost invariably infected, and we do not believe that the drainage which follows excision of these cysts always represents an incomplete excision. The point that we are trying to make is that in order to obtain complete obliteration of this dead space there must also be a concomitant control of the infection. We therefore concentrate on the post-operative eradica-

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This photo illustrates the extent of healing four weeks after we had excised pilonidal cyst of E. K., who was our sixth consecutive case to be treated in the manner already described.

She gave a history of having had two previous abscesses in the sacrococygeal region. Both were incised and drained on 10-28-53 and 8-9-54.

The pilonidal cyst was excised on 8-24-54.

tion of this infection by the local use of antibiotics. This has the advantage of giving higher concentration of the drug in an area where it is most needed. This treatment consists of daily injections of crystallin penicillin (after removal of the drain) into this dead space during the patient's hospital stay. Later on the patient is instructed to return at bi-weekly intervals for swabbing of what remains of the dead space with one of the more recent antibiotic ointments or powders, such as aureomycin or tetracyn.

Summary

It is gratifying to be able to report under this regime, a complete cure of these cases within a period of four to eight weeks.

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Postgraduate Teaching Fund for Gift Subscriptions

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As a teaching and educational organization, the Academy is pre-eminent in Proctology. The Annual Conventions are literally postgraduate courses, and the Journal has raised the level of Proctology throughout the world.

EDITORIAL

Some Notes on the Early Study and Treatment of Proctologic Conditions

Recently, I have been giving some thought to the history of Medicine, Surgery and Proctology. Early in June this year while examining the ruins of Pompeii in Italy, I viewed some ancient surgical instruments and particularly an anal speculum. This stimulated me to review the history of Proctology and Surgery.

There are three physicians I would like to mention and describe some of their accomplishments in regard to the early study and treatment of proctological conditions, but first I will classify the different periods:

I. The Mythological, extending from infancy of the human race to 400 B.C.

II. The Dogmatic or Empirical. The history of medicine really begins with this age and is from 400 B.C. to the close of the 18th century.

III. The Rational age begins about the close of the 18th century and beginning of the 19th and is founded on the ruins of the old schools with the new facts being discovered by rapid progress in Anatomy, Physiology, Proctology, Chemistry and Collateral Science.

We must recognize John Arderne (1307-1390), an English surgeon of great accomplishment, especially in Proctology. He was educated at Montpellier in France and was of Saxon descent. He therefore favored the Saxon and French Teachings and was probably influenced by Henri DeMondeville (1260-1320) and Guy DeChauliac (1300-1368).

Dr. Tabaka

His writings were in Latin and cover many subjects and monograms on Hemorrhage of the eye, Intestinal obstruction and a Treatise on Fistula in Ano and Fistula in other places in the body. The author writes from a clinical standpoint, the idea being to illustrate the diseases and their management from personal experience. His rank in England was Master of Surgery or the equivalent of surgeon of the long robe to distinguish from barber Surgeons.

Arderne was acclaimed the father of British Proctology because he described and used what is now the modern operative treatment for fistula in ano and described proctology and etiology accurately. His technique, pre-operative and post-operative care are described fully, as well as surgical instruments. He also wrote on Cancer of the Rectum, Prostatitis, Pruritus and in detail on

This month's guest editorial is presented by Francis B. Tabaka, B.S., M.D., F.I.A.P., member of the Surgical Staff, Columbus Hospital, Chicago, Illinois.

Hemorrhoids.

John Arderne lived in a rather chaotic time of the middle ages and a changing of the times. It was at a time when the manorial system was breaking up; strikes and uprisings were frequent. In 1349 occurred the scourge of Black death in which one third to one half of the population died. This century covered part of the hundred years' war. Chaucer was born and the English language was accepted. This man was considered a surgeon and also a proctologist, and is known also as the first great operating surgeon in England, followed by Peter Lowe of Glasgow, Wiseman, John Hunter, Astley Cooper and the incomparable Lister.

Frederick Salmon, born in Bath in 1796 was born destined to be the father of Proctology and the Founder of St. Marks in London. In 1835, he opened a hospital for rectal diseases. In 1854 on April 25th, St. Mark's day, St. Mark's Hospital was opened.

In 1859 Salmon retired, leaving for proctology a great name, a great Hospital and a book, his Practical Treatise on stricture of the rectum, and a ligature operation for hemorrhoids.

Other great names to follow Salmon in England were Goodsell, Allingham, Miles and Gabriel.

The first American proctologist, Joseph McDowell Matthews was born in New Castle, Kentucky in 1844. In 1866 he enrolled in the Medical department of the University of Louisville. After 1 year he received his diploma and practiced with Dr. Oldham for a time. In 1877 he enrolled at St. Mark's Hospital in London, and Mr. W. Allingham was chief surgeon at the time. On returning home he opened offices in Louisville, Kentucky for treatment of rectal diseases only, and was the first physician in the U.S. to confine practice wholly to proctology. One year after returning, he became professor of Surgical Pathology in the Kentucky School of Medicine and four years later a department of rectal disease was created and Matthews was named head of the department.

Matthews had received good training in London and was a great boon to proctology in the country. He helped to put proctology in its proper place in the medical profession and remove it from the itinerants and charlatans who termed it Orificial Surgery. Matthews wrote papers on the diagnostic resources in Rectal Surgery, and Diagnosis and Treatment of Rectal Cancer. For a time he opposed total extirpation of Rectum for Cancer and then some years later, Kraske did five operations and stated that the time would come when this method would be discarded.

He rejected the theory of his contemporaries that fistula operations should not be done in patients with tuberculosis. He disagreed with Allingham that all internal piles should be excised. He believed in the old St. Mark's dictum, "ligate the internal hemorrhoids and cut off the external hemorrhoids." In 1893, he wrote and published a Treatise on Diseases of the Rectum, Anus and Sigmoid Flexure. This was the first orthodox proctology book published in the U.S. After retiring, he moved to Los Angeles and died in December, 1928.

During the time of Joseph MacDowell Matthews, diagnostic and laboratory assistance were not available. Because of his training, intelligence and industrious nature, professional honesty and excellent personality, he contributed

greatly to his specialty and medicine. He had an outstanding personality and was liked by all.

Major factors in the development of modern proctology have been the International Academy of Proctology and its remarkable official publication, The American Journal of Proctology.

The International Academy of Proctology, in a few short years, has made great strides as a Teaching and Research society. Some of the functions of the Academy are the establishment and financing of Fellowships, Research Projects, Free Yearly Teaching Seminars, and Free Journals to major hospitals. I believe that even greater strides will be made by the Academy in the future, and medical historians will record the Academy as the Father of modern Proctology.

Francis B. Tabaka, M.D.

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Sigmoidoscopic Examinations

Satisfactory sigmoidoscopic examinations were possible "within minutes" in 53 out of 66 cases when sodium phosphate and biphosphate mixture was used at a cancer detection center for cleansing the rectum and sigmoid, Dr. Joseph M. Gross of Brooklyn, N. Y., reports in the *Journal of the International College of Surgeons, 23*:34 (Jan.) 1955. The patients had taken no preparatory enemas.

Among a control group of 175 who were asked to prepare at home with two enemas, only 62, or 35 per cent, of the examinations were rated as satisfactory.

Investigation of the new method was undertaken at Beth El Hospital, the author states, after it was found that the routine preparatory administration of repeated enemas "carried too low a percentage of properly prepared sigmoids for examination in a cancer detection center." The phosphate mixture was supplied in "plastic disposable squeeze bottles with foolproof tips" as Fleet Enema Disposable Units.

"The striking feature of a sigmoidoscopic procedure after such preparation is the ease of examination," reports Dr. Gross. "Relaxation is so marked that in each case one is reminded of a megacolon. . . . The sigmoidoscope seems to fall in without effort and without discomfort to the patient."

The author comments that patients "coming to a detection center as a routine, or because of concern over some organ, pay scant attention to instructions for preparation. Many wish to avoid the proctoscopic examination altogether. Some, having come to the clinic directly from their work, are unable to take the enemas at all. In our clinic, experience has shown that satisfactory sigmoidoscopic examination under these circumstances is possible in only one-third to one-half of the examinees."

General Procedure Preoperative and Postoperative Care

Preoperative Care

The Hospitalized Patient

1. Assure a good night's rest the day before an elective operation with a 3 gr. capsule of sodium amytal at bedtime.
2. 1½ grs. of nembutal (capsule) is given two hours, and again one hour before surgery.
   In place of the second nembutal capsule, ¼ gr. of morphine sulfate and 1/150th gr. of atropine sulphate may be given by hypodermic syringe one hour before operation.
3. A luke-warm, tap-water enema is ordered for the night before surgery. Never use soap (it is irritating).
   Never use an enema immediately before surgery. Retained fluid may return to the operative field throughout the surgery.
4. No breakfast.
5. Anesthesia-Single puncture caudal analgesia is preferred. Low spinal (saddle block) anesthesia is second choice. Local infiltration or block anesthesia is third choice.
   (The preparation of patients for anal-rectal surgery does not require routine use of either sulfonamides or antibiotics.)

The Ambulatory Patient

1. Sedation and enema the night before surgery. Sedation may or may not be used immediately preceding surgery.
2. Anesthesia-Single puncture caudal analgesia is preferred. Low spinal (Saddle block) anesthesia is second choice, but may be preferred by the hospital anesthetist. Local infiltration or block anesthesia is third choice.
   Inhalation anesthesia is fourth choice.
3. The perianal area should be carefully shaved.
4. No breakfast.

Postoperative Care

Dressings

The immediate post-operative dressing is a pressure pack, held in place by broad adhesive straps, drawing together the buttocks. Oxidized cellulose gauze is inserted into the rectum, and gauze packing placed over the external wounds, for pressure.

Both ambulatory and hospitalized patients may use a sanitary napkin and belt for subsequent post-operative dressings, to hold a single sterile gauze square on the operative area.

Compresses

Hot witch hazel compresses will provide comfort for the patient who has received no oil-soluble anesthetic. These are begun the evening of surgery.

First Bowel Movement

No bowel movement is permitted until the second post-operative day.

A mineral oil instillation may be required.

One ounce of mineral oil is prescribed as a nightly dose, beginning the day of surgery.

One ounce of milk of magnesia and one ounce of mineral oil are taken the night before the planned bowel movement.

Pain

There is relatively little pain if the patient has had oil-soluble anesthetic infiltration at the time of surgery. The hospitalized patient may require morphine sulfate, 1/4 gr. dosage, by hypodermic, p.r.n.

The ambulatory patient is given a prescription for an analgesic capsule containing 3/4 gr. demerol, 1/12 gr. dolophine and 1/20 gr. dilaudid. A 3 gr. capsule of sodium amytal is to be taken at bedtime.

Urinary retention. This may be a major factor in the cause of pain. Catheterize as required.

Early Ambulation

The hospitalized patient should be made ambulatory as rapidly as possible, preferably on the day of surgery. *Immediate* ambulation is the rule in office surgery. After caudal analgesia, and with the protection against pain by a long-lasting oil anesthetic, immediate ambulation is the rule.

Patients are allowed to dress forty-five minutes after surgery, often to drive their own car home.

Sitz Baths

Begin hot sitz baths (110 F.) the day after surgery, ten minutes night and morning each day.

Office Care

Avoid intra-rectal digital manipulation until fourteen days after surgery. An anesthestic, healing ointment such as 4 per cent scarlet red combined with 0.5 per cent tetracaine base in lanolin, is applied freely. Digital exploration is advised on alternate days thereafter until healing is complete. This prevents stricture or stenosis.

Destroy excessive granulation tissue by a silver nitrate stick or hot cautery.

Antibiotics

Aqueous procaine penicillin G (300,000 units), is given intramuscularly at the time of surgery, and on each of the first two post-operative days. Infected cases require longer periods of antibiotic therapy.

Instruction Sheets

Ambulatory patients are provided with printed post-operative instruction sheets, to avoid dependence upon the patient's memory. The first (operative) day instructions are as follows:

Postoperative Instructions

1. Take two large tablespoons of mineral oil each night, beginning tonight.

2. You may eat any food other than fruits, fruit juices or raw vegetables.
3. Tomorrow you may eat all foods, including fruits, fruit juices and raw vegetables.
4. *Do not move your bowels* until you are told to do so. (Ignore the urge and it soon disappears.)
5. You will receive a prescription for both pain and sleeping capsules. If you have pain take one capsule. If you continue to be uncomfortable, you may take both a pain and sleeping capsule one hour later. Darken your bedroom, relax and try to sleep. *DO NOT TAKE THESE UNLESS YOU ARE IN PAIN.*
6. Take one sleeping capsule at bedtime. If you waken during the night take another.
7. Buy Kotex (or any other sanitary napkin), an elastic sanitary pinless belt and sterile 3x3 gauze squares. Bring the pads and belt to the office at the time of your first visit.

Instruction for the second post-operative week are as follows:

1. During the next seven or eight days the stitches will be coming away. Reduce activity to a minimum.
2. Lie down as much as possible, do not lift anything heavy, do no housework, and do not strain at bowel movement.
3. Take no aspirin at any time.
4. Retire early every night.

Instructions for Enema Technic are as follows:

Warm Water Enema

1. *DO NOT* use the tip usually supplied with an enema bag.
2. Use a soft rubber rectal tube (may be purchased in a drug store).
3. Lubricate the rectal tube freely with vaseline.
4. *DO NOT* insert the tube more than 2".
5. Have the enema bag about 12" above the level of your hips.
6. Lie on your left side, on the floor of your bathroom (or bed—see step 9).
7. Allow the water to run in slowly. If uncomfortable (cramps), pinch off the tubing until the sensation passes. Open your mouth and breathe deeply. *DO NOT* remove the tube.
8. Allow about 1 quart of water to run in. Remove the rectal tube and turn on your back, raising your feet above the rest of your body. (You may rest them either on the bathtub or on the toilet). Try to retain the water (in this position) for at least 5 minutes.
9. If you prefer, you may follow this same procedure lying on the bed instead of the floor, using a bedpan if available.

Complications

1. Abscess.
   Since the advent of the antibiotics, post-operative abscess is uncommon. If it occurs, it should be incised and drained without delay. Increased dosage of antibiotics should then be given, intramuscularly.
2. Hemorrhage.
   A moderate amount of rectal bleeding is to be expected during the first two weeks, while the sutures are coming away. Active rectal

bleeding is most apt to occur between the seventh and fourteenth post-operative days. Prevention requires careful attention to the above instructions for the second post-operative week.

Treatment may be by packing with oxidized cellulose gauze (with or without thrombin solution), gelatin pack, or an accordian pleated gauze pack. The latter is preferred for really active bleeding.

The accordian pack is introduced through a small or medium size, well-lubricated anoscope, the anoscope is withdrawn, and the pack is drawn tight against the bleeding area. This pack may be made still more effective by saturation with a hemostatic, styptic solution of the following formula: Monsell's solution ounces 11, solution S.T.-37 ounces 11, and tr. iodine ounces 1.

A single pumping vessel is best treated by mattress suture, under caudal analgesia. In some cases blood transfusion will be indicated. Active hemorrhage cases are best hospitalized.

Stenosis or Stricture

Uncommon. Break down adhesions and scar by digital manipulation. Posterior proctotomy should be performed if indicated. (See Office Care for prevention).

Systemic

Systemic complications after anal-rectal surgery are practically unknown.

✚

Significant Quotes on Cancer Detection

"At least 70 to 80 per cent of cancers of the large bowel and sigmoid are detectable or visible through the sigmoidoscope." Editorial, *American Journal of Surgery, 88:*208 (August) 1954.

"Because of their malignant potentialities, early detection and treatment of polyps of the colon and rectum will prevent the development of a substantial number of cancers of the large intestine." Gianturco, C., and Miller, G. A.: *C A*, published by the American Cancer Society Inc., *4:*77 (May) 1954.

"The increase in the number of benign polyps detected in patients has been in direct proportion to the number of sigmoidoscopic examinations performed regardless of symptomatology." Swinton, N.W., and Doane, W.A.: *C A*, published by the American Cancer Society Inc., *4:*78 (May) 1954.

"The utmost in early diagnosis of cancer in this (the colon) area will not be reached until digital examination and sigmoidoscopy are universally included in the routine physical examination." Baker, B.A.: *Northwest Medicine, 52:*458 (June) 1953.

"We feel that sigmoidoscopic examination is so important that we do not consider any physical examination complete without this procedure. It is tragic to see the cases which come to us every day, in which malignancy is already far advanced and which could have been detected at an early stage had a proper physical examination been made in time." Halligan, E.J.: Address at Fifth Annual Convention, International Academy of Proctology (May) 1953.

Pediatric Proctology —Megacolon

Part 3

Megacolon was first described by von Ammon in 1842. However, the classic description was that of Hirschsprung in 1888. Hirschsprung's original observations were based on a study of two cases, and the condition continues to be rare.

Despite the fact that the disease was first described over 100 years ago, it is only within the past five years that a more adequate concept of the fundamental etiology has been developed.

Again, although Hirschsprung stated, in his original article, "The large intestine is dilated—only the rectum is not enlarged"—this very significant fact has apparently been overlooked in consideration of etiology.

In 1925 Bartle offering the theory of over-activity of sympathetic impulses to the rectum, and lumbar sympathectomy was recommended.

Autopsy material from Hirschsprung's disease cases (Robertson and Kernohan, 1938), revealed the absence of myenteric ganglia in sections from the rectal wall. Similar sections from patients dying of ulcerative colitis revealed myenteric ganglia.

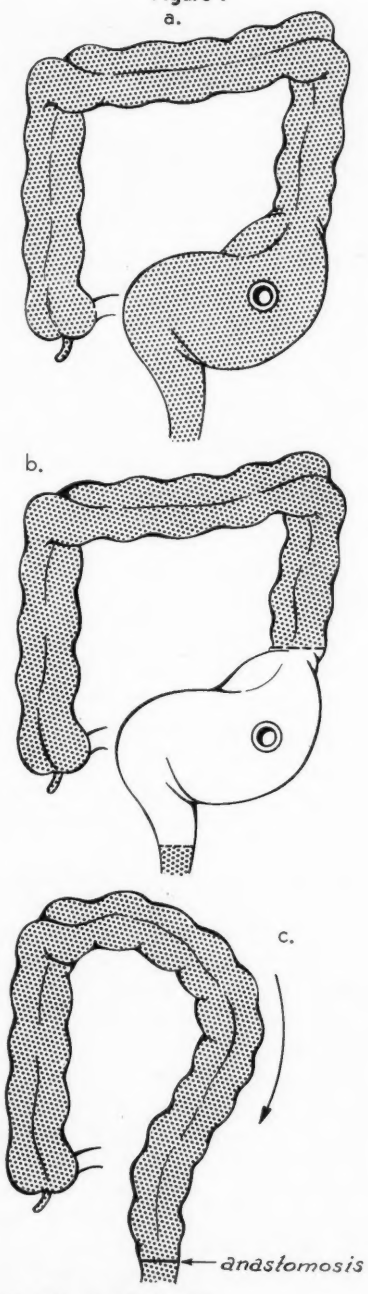
The work of Cannon showed that destruction of the myenteric ganglia results in absence of peristalsis in that portion of the bowel.

Based upon these observations we may conclude that in true Hirschsprung's disease the rectum and part of the pelvic colon demonstrates a congenital absence of the myenteric ganglia.

Megacolon occurs in two forms. One group of cases is of mechanical origin, resulting from cicatricial stenosis or anal-rectal malformation. Obviously, any structural narrowing must lead to dilatation above the point of narrowing. In this group we would have to include the patient with psychogenic obstipation and megacolon, the anal sphincter being the region of obstruction. In these cases, of course, the neural anatomy of the bowel is intact.

The second group of cases is the true idiopathic megacolon or Hirschsprung's disease. Careful examination reveals no actual mechanical obstruction. The anatomic lesion is apparently a congenital lack of the myenteric and submucous ganglia cells from the lower, none dilated segment. The usual progressive peristaltic reflex of the intes-

Figure I



tinal wall is absent in this region.

In about 90% of such cases myenteric and submucous ganglia are absent only from the rectal and sigmoid colon segment. In the other 10% this deficiency extends further, and apparenty occasionally involves the entire colon.

We may therefore define Hirschsprung's disease *as a functional obstruction of the bowel resulting from a congenital absence of the myenteric ganglia in the narrowed rectal or rectosigmoid area, with secondary dilatation and hypertrophy of the colon above that level.*

True idiopathic megacolon appears more often in boys than in girls. There may be more than one case in a family, and Dodian reported idiopathic megacolon in a pair of monozygotic twins. This suggests a genetic factor.

In most patients with congenital megacolon obstipation begins at birth. If the obstruction is severe, and chronic hypertrophy has not had time to develop, the clinical appearance will be that of ileus. There will be early projectile vomiting. Pressure necrosis of the mucosa of the sigmoid may be evidenced by bloody diarrhea, and perforation, peritonitis and death may follow. Emergency decompression of the bowel is indicated.

In these cases digital examination reveals a narrowing of the rectum in its middle and upper portions, with the spasticity relaxing gradually with pressure. There may be a gush of fecal material or meconium with the removal of the examining finger.

The classical evidences of congenital megacolon develop if the patient survives early infancy. As the colon progressively dilates, the abdomen enlarges, and colonic peristalsis may be visible

through the abdominal wall. General health and nutrition may or may not be impaired.

Bartle states that without treatment an estimated mortality of 85% may be expected for infants and young children with severe congenital megacolon. The prognosis for life is fairly good if the patient survives the first five years.

The older literature indicates mortality rates after medical treatment ranging from 19 to 79%. However, careful medical treatment may be successful for many years, as evidenced by a report of a 53-year-old physician with severe and unremitting constipation since birth, and marked colonic dilatation and hypertrophy. (Rosin, Bargen and Waugh, Mayo Clinic, 1950). Their review states that "meticulous and adequate medical management is compatible with good general health and with an active and productive life."

However, these patients usually suffer from intermittent episodes of acute obstruction by fecal impaction, requiring digital removal of the masses. Without proper care ulceration of the colon and perforation may develop. More recent statistics would seem to indicate that expectant treatment is accompanied the newborn. The clinical picture, as indicated, may be simply that of intestinal obstruction.

Diagnosis may be very difficult in the newborn. The clinical picture, indicated, may be simply that of intestinal obstruction.

Rectal examination will determine the presence or absence of obstruction in the rectum or rectosigmoid.

Psychogenic obstipation must always be considered in the older child. There is no clinical distinguishing feature in such cases.

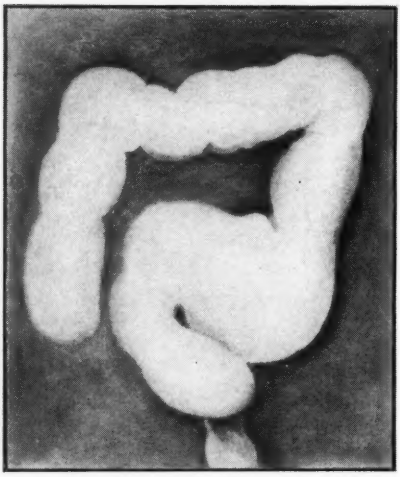


Figure 2

A very careful barium enema roentgen study will be of value. Observe the first few cubic centimeters of barium as they flow into the rectum and rectosigmoid, specially from a lateral or oblique position. This usually demonstrates a characteristic picture of congenital megacolon, with the dilated proximal segment of large bowel ending abruptly in the upper rectum or lower sigmoid. (Newhouse, 1949).

It is important to remember that a small amount of barium in the patient being examined in an oblique position will clearly demonstrate the narrow segment of colon between the rectum and dilated sigmoid in true congenital megacolon. (Fig. 2).

State (1952) also reports that roentgen studies indicate a normal caliber for the rectum, good haustral markings and evidences of normal contractility in the right colon, cecum, ascending and transverse colon, and marked dilation without haustral markings or peristaltic activity in the descending and

sigmoid colon. The latter author uses the roentgen findings to determine the extent of surgical excision, removing those portions of the colon which are dilated and show no peristaltic activity. The rectum is retained and anastomosed to the right side of the transverse or ascending colon which shows good peristaltic activity on roentgen study.

The roentgenologist must always be careful to remove the barium suspension as completely as possible after diagnostic enema to avoid mechanical obstruction by the barium. Of course, these patients should never receive oral barium.

Treatment may be medical in the milder cases. Daily enemas may be required. Very careful enema, diet and drug management may postpone ultimate surgery. In some cases surgery may never be required. Mineral oil or milk of magnesia by mouth may be of value.

A word of caution must be spoken on the use of hypotonic mixtures in enemas. Large volumes of fluid by enema are well tolerated by these patients, and if a hypotonic mixture is given there may be abstraction of electrolytes from body fluids and demineralization. Sudden death has been reported during or immediately following a copious tap water enema, presumably due to the disturbance of mineral balance.

Various drugs acting on the autonomic innervation have been suggested, including Syntropan, Mecholyl, Prostigmine and Ergotamine Tartrate. Only temporary improvement is to be expected from these drugs.

If the drug action does show improvement, the enemas may be gradually discontinued.

The diet should be non-fermentative and stimulating to the bowel musculature. Supplementary vitamin and mineral therapy is always indicated, both by mouth and parenterally in patients with severe nutritional imbalance.

If medical management of the megacolon is unsatisfactory after a fair trial of several months, surgery will be indicated.

Radical cure is possible after surgical removal of the aganglionic portion of the rectosigmoid and rectum. Swenson and Rheinlander report thirty such resections in 1952, only two of these patients requiring a preliminary colostomy. They speak of only two indications for colostomy, 1,— patients with almost complete large bowel obstruction and distension that cannot be controlled and reduced by colonic irrigation, and 2,—patients whose extremely poor conditions make primary resection hazardous. They have abandoned their original multiple stage operation.

These authors state that patients with Hirschsprung's disease who require proximal decompression are treated by performing a sigmoid colostomy. The opening is made in the dilated, hypertrophied colon and not in the narrow, aganglionic bowel. A small piece of colon wall down to the mucosa is removed at the expected level of colostomy and immediately examined for ganglion cells. This is to assure placing the colostomy in an innervated intestine.

Some months later, when the patient is ready for resection, the colostomy is detached from the abdominal wall and is removed with the distal aganglionic colon. An anastomosis is performed between the lower rectum and the colon proximal to the colostomy.

Therapeutic Abstracts

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Urological Complications Following Abdominoperineal Resection of the Rectum

BAUMRUCKER, G. O. and SHAW, J. W.:
Arch. Surg. 1953, vol. 67, No. 4 (Oct.)
pp. 502-513.

In 105 resections, observed perineal fistulas in 5% (all closed spontaneously during Foley catheter drainage for varying periods), ureteral injuries in 6% (prevention is suggested by preoperative insertion of ureteral catheters), and neurogenic vesical dysfunction in 20% (prophylaxis suggested by indwelling urethral catheters for 10 to 14 days).

Those with extended experience might question the surgical technique which produces such persistent and profound urinary retention. C.J.B.

Bowel Perforation Following Enema Through a Permanent Colostomy

KAUFMAN, P. A. and SWERDLOW, H.:
Arch. Surg. 1953, vol. 67, No. 4 (Oct.)
pp. 612-615.

Fortunately, the first patient, who attempted to irrigate through his colostomy, survived because he was operated on and the intraperitoneal perforation sutured. The second patient, with intraperitoneal barium as a result of barium injection through his colostomy, was permitted to die without pyramiding the risk of surgery by his auricular fibrillation and cardiac decompensation. Proper colostomy irrigation instructions, with emphasis on the danger accompanying instillation of almost two liters of water at once, might prevent the disaster experienced by the first patient. Knowing that death from massive intraperitoneal barium infusion is certain, a skilled surgeon accepts certain calculated risks in order to open the narrow avenue of escape by operation. C.J.B.

One-stage Colectomy Including Abdominoperineal Resection with Primary Ileostomy

PALUMBO, L. T. and RUGITIV, G. M.:
Arch. Surg. 1953, vol. 67, No. 5 (Nov.)
pp. 762-768.

In each of seven patients, the operation described in the title was carried out through a transverse curvilinear infra-umbilical incision, a separate right oblique incision being made for the ileostomy. No deaths occurred; good results were obtained; sexual intercourse could be completed normally. The one stage operation is recommended for patients other than in the far advanced stages of chronic ulcerative colitis C.J.B.

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BOOK REVIEWS

FOR PROCTOLOGISTS

ABDOMINAL OPERATIONS by Rodney Maingot, F.R.C.S., Eng. Surgeon to the Royal Free Hospittal, London and to the Southend General Hospital. Third Edition. 1580 pages. 74 figures. 72 tables. Appleton-Century-Crofts, Inc. 1955.

This text is now in its third edition, and continues to be one of the most complete and best written works of its kind. The second edtiion was published in 1948, and there is considerable revision and new material in the latest book.

The section authors are highly authoritative, and there is a good representation of American authors.

The illustrations are excellent throughout and the text may be recommended to the resident surgeon, the general surgeon and the abdominal surgeon.

The proctologist will find excellent sections on colon surgery (15 contributions).

This is a volume that should be included in every general surgeon's library, as well as in the library of the specialist.

TEXTBOOK OF GENERAL SURGERY by Warren H. Cole, M.D., F.A.C.S., Professor and Head of the Department of Surgery, University of Illinois College of Medicine; Chief Surgeon, Illinois Research and Educational Hospitals, Chicago, and Robert Elman, M.D., FA.C.S. Professor of Clinical Surgery, Washington University School of Medicine; Assistant Surgeon, Barnes Hospital; Associate Surgeon, St. Louis Children's Hospital; Chief of Staff and Director of Surgical Service, H. G. Philips Hospitals, St. Louis. Foreword by Evarts A. Graham, M.D., F.A.C.S. Sixth Edition 1154 pages, 558 illustrations. Appleton-Century-Crofts, Inc., New York 1952. Price $12.50.

The Sixth Edition of this classical text brings the material entirely up-to-date. There are changes in every chapter, some extensive.

The section on chemotherapy is entirely new. The same may be said for the excellent section on vascular surgery.

Marked revisions are noted in the material on preoperative and postoperative care. The gastroenterologist will be particularly interested in the newer treatment of massive upper gastrointestinal hemorrhage.

The approach continues to be physiologic throughout, with emphasis upon pathogenesis.

The choice of illustrations is excellent, and the generous use of illustrations makes the text valuable for teaching purposes as well as for the clinical surgeon.

However, details of surgery are avoided, and operations are discussed only in principle.

THE BILLROTH I GASTRIC RESECTION by Horace G. Moore, Jr., M.D., Wilmington, North Carolina; formerly Instructor in Surgery, University of Washington School of Medicine; formerly Chief Resident in Surgery, King County Hospital, Seattle, and Henry N. Harkins, M.D., Ph.D., F.A.C.S., Professor of Surgery and Executive Officer of the Department of Surgery, University of Washington School of Medicine; Surgeon-in-Chief, King County Hospital, Seattle; formerly Associate Professor of Surgery, Johns Hopkins University School of Medicine. 175 pages. Price $7.50. Little, Brown & Co., Boston.

This is an excellent monograph on the technical physiological advantages of the Billroth I operation in the surgery of peptic ulcer. The illustrations are excellent throughout, and entirely adequate.

The abdominal surgeon should be able to perform an expert Billroth I and Billroth II operation.

Of course, we must remember that the Hofmeister and the Polya modifications of the Billroth II operation will also give a high percentage of fine results. Further, the Billroth I operation is probably not the best procedure for carcinoma.

We must also remember that stomal obstruction may develop more often after the

—Continued on page 162

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—Continued from page 160

Billroth I operation than after the modifications of the Billroth II, due to the smaller stoma. Again, the Billroth I anastamosis may not be entirely satisfactory in the duodenal ulcer case with marked inflammation and fixation surrounding the first portion of the duodenum.

Despite these disadvantages, all of which are well answered in the text, the Billroth I operation has much in its favor.

This text is recommended to all gastic surgeons.

1954 MEDICAL PROGRESS by Morris Fishbein, M.D., Editor, 345 pages, The Blakiston Co. Price $5.00. The coverage in this text includes the medical advances of 1953 as seen by a distinguished Board of Editors. Insofar as each field is covered by one or more authorities, the reader will find the material both carefully selected and well presented.

The gastroenterologist will find an excellent section by David J. Sandweiss and Frank P. Brooks. The chapter on Nutrition will be of interest to every practitioner.

The surgeon will find the newer advances in his field described by Charles W. Mayo and Lowell R. Smith.

There is an excellent section on the newer drugs, both their actions and uses, and another fine chapter on Infectious Diseases.

The Proctologist will be especially interested in the material on Surgery of the Colon in the section on Surgery. This considers chronic ulcerative colitis, diverticulitis, polyps and carcinoma.

FUNDAMENTALS OF CLINICAL CANCER by Leonard B. Goldman, M.D., Clinical Professor of Radiotherapy, New York Medical College, Flower and Fifth Avenue Hospitals; Chairman, Tumor Conference and Director, Radiation Therapy Department, Queens General Hospital; Consultant Radiation Therapist, Flushing, Rockaway Beach and Triboro Hospitals, New York City. 312 pages 221 illustrations. Grune & Stratton, New York 1953.

This book will be of clinical value to all physicians. The general practitioner as well as those who diagnose and treat cancer as a specialty, will benefit greatly from the outlined fundamentals of early diagnosis and the general considerations of therapy.

Known preventive measures are given primary position. The key-note of the book is early diagnosis and treatment.

The illustrations throughout are of very high quality, and exceptionally valuable for teaching purposes. The book is written in simple, readable style.

Therapy is limited to recommendations on "what to do rather than on how to do it."

The author's concept that tumors are to be considered malignant until proved benign is excellent. This will lead to early diagnosis and proper treatment in most cases.

The gastroenterologist and proctologist will be especially interested in the section on tumors of the gastrointestinal tract. It is concise, well written, beautifully illustrated, and adequately summarizes our present knowledge of diagnosis and therapy of malignancy in this region.

This book is recommended for all physicians, regardless of specialty.

PHYSIOLOGY by Rolland J. Main, Ph.D., formerly Professor of Physiology, Medical College of Virginia, Richmond, Virginia. Revised by Alfred W. Richardson, Ph.D., Assistant Professor of Physiology, Indiana University School of Medicine, Bloomington, Indiana. 474 pages, price $7.00, September, 1953, St. Louis, C. V. Mosby.

The average physician will find this text a welcome relief from the extensive, standard reference books on Physiology. This little book covers the essentials, without giving the usual data of comparative Physiology.

Of course, it will not do for the research physiologist. Physiology is developing rapidly, and there is much room in the average text devoted to the presentation of controversial material. This is not so in the present book.

The second edition is a complete revision of the first. The newer developments of physiology are incorporated, but the material remains fundamental in importance.

The Gastroenterologist and Proctologist will find an excellent chapter on digestion.

INDIVIDUAL AND COMMUNITY HEALTH by William W. Stiles, M.D., M.P.H., Associate Professor of Public Health, University of California, Berkeley. 492 pages, The Blakiston Company, New York, Toronto.

Health education is of primary and fundamental importance in the battle against disease. It is interesting to note that if our presently available information in health education were fully utilized throughout the world, the average length of life could be extended to approximately eighty years.

Such health information should be made available to college students in all branches

—Concluded on page 164

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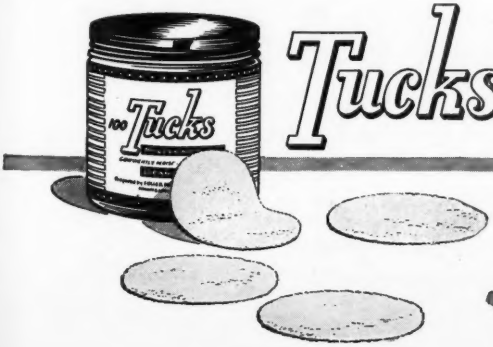

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—Concluded from page 162

of the arts, as well as to medical students. Thus, it could be extended throughout our entire society.

This book is well written, exceptionally well organized, and interestingly illustrated. The gastroenterologist and proctologist will find an excellent chapter on disorders of nutrition, digestion and metabolism, another well rounded consideration of food sanitation, and a complete section on fecal-borne diseases.

SIGNS AND SYMPTOMS edited by Cyril Mitchell MacBryde, A.B., M.D., F.A.C.P. Associate Professor of Clinical Medicine, Washington University School of Medicine; Assistant Physician, the Barnes Hospital; Director, Metabolism and Endocrine Clinics, Washington University Clinics, St. Louis, Missouri. Second Edition with 98 Illustrations, 50 Charts and 8 Color Plates. 783 pages. J. B. Lippincott Company, Philadelphia, 1952. Price $10.00.

This is a book written for the clinician. In the writing of any book the view point of the author is exceedingly important. In this case the editorial policy is clear. The emphasis throughout is upon the analysis of signs and symptoms, and their interpretation in determining pathology.

Each chapter analyses a symptom or sign, such as pain or headache. Pain, to take a good example, is discussed from the clinical view point, as well as from the perspectives afforded by anatomy, physiology and psychology.

The second edition of this excellent text contains new chapters on Pathologic Bleeding, Pigmentation of the Skin, Vertigo and Dizziness, Clubbed Fingers and Hypertrophic Osteoarthropathy. The text is well written throughout, by authors of authority.

The proctologist will be especially interested in the section on pain, the chapter on Abdominal Pain, Anorexia, Nausea and Vomiting, an excellent chapter on Constipation and Diarrhea, the chapter on Melena, (and on Pathologic Bleeding), and a very fine section on Pruritus.

There is much need for basic textbooks of this type.

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LETTERS TO THE EDITOR

—Concluded from page 108

bathing must be reduced, and a fresh strip of adhesive should be applied on alternate days.

I do hope this will help you with your problem case. Good luck!

The Editor

Hirschsprung's Disease

Dear Sir:

As a gastroenterologist I have perhaps naturally favored the medical management of Hirschsprung's Disease. My friends in general surgery feel that a pull-through operation such as that described by Swenson, is best performed as soon as possible, and that medical management is no longer indicated in this condition.

What is the opinion of the proctologist?

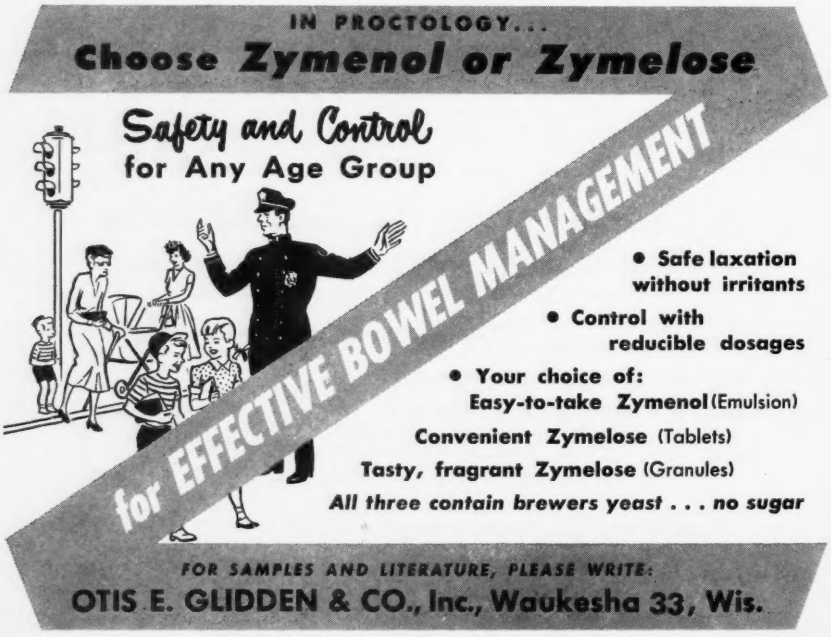
R. L., Tennessee

Very careful medical management may be advisable in mild or moderately severe Hirschsprung's Disease patients. However, there is no simple answer to your question, and therapy must be individualized.

Please refer to the section of this Journal on Pediatric Proctology, dealing with Hirschsprung's Disease. It may answer your question.

If it does not, please write once again, and—if possible—describe the specific problem you may have under consideration.

The Editor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